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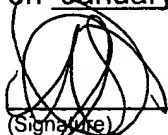
TITLE: RUGGED SHOCK-RESISTANT BACKPLANE FOR EMBEDDED SYSTEMS

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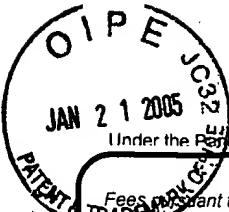

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FEE TRANSMITTAL
For FY 2005☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT** (\$) 50 0.00**Complete if Known**

Application Number	09/544,762
Filing Date	April 7, 2000
First Named Inventor	Shannon Mary Nelson
Examiner Name	Reza Sedighian
Art Unit	2633
Attorney Docket No.	NORTE-390Q2

METHOD OF PAYMENT (check all that apply)☒ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____☐ Deposit Account Deposit Account Number: 19-4330 Deposit Account Name: Stetina Brunda Garred & Brucker

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below☐ Charge fee(s) indicated below, except for the filing fee☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17☒ Credit any overpayments**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims **Extra Claims** **Fee (\$)** **Fee Paid (\$)**

_____ - 20 or HP = _____ x _____ = _____

HP = highest number of total claims paid for, if greater than 20

Indep. Claims **Extra Claims** **Fee (\$)** **Fee Paid (\$)**

_____ - 3 or HP = _____ x _____ = _____

HP = highest number of independent claims paid for, if greater than 3

Multiple Dependent Claims**Fee (\$)** **Fee Paid (\$)****3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
_____ - 100 = _____	_____ / 50 = _____	(round up to a whole number) x	250.00	0.00

4. OTHER FEE(S)**Fees Paid (\$)**

Non-English Specification, \$130 fee (no small entity discount)

Other: Filing an Appeal Brief in Support of an Appeal

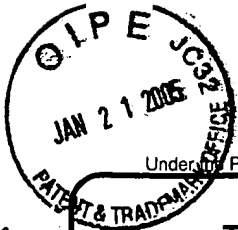
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SUBMITTED BY

Signature		Registration No. (Attorney/Agent)	28,497	Telephone	(949)855-1246
Name (Print/Type)	Bruce B. Brunda	Date	January 19, 2005		

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**TRANSMITTAL
FORM**

(to be used for all correspondence after initial filing)

Application Number	09/544,762
Filing Date	April 7, 2000
First Named Inventor	Shannon Mary Nelson
Art Unit	2633
Examiner Name	Sedighian Beza
Attorney Docket Number	NORTE-390Q2

Total Number of Pages in This Submission

ENCLOSURES (Check all that apply)

<input checked="" type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> After Allowance Communication to Group
<input checked="" type="checkbox"/> Fee Attached	<input type="checkbox"/> Licensing-related Papers	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input type="checkbox"/> Amendment/Reply	<input type="checkbox"/> Petition	<input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)
<input type="checkbox"/> After Final	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/declaration(s)	<input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address	<input type="checkbox"/> Status Letter
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<input type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> CD, Number of CD(s) _____	
<input type="checkbox"/> Certified Copy of Priority Document(s)	Remarks	
<input type="checkbox"/> Response to Missing Parts/Incomplete Application		
<input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	BRUCE B. BRUNDA
Signature	STETINA BRUNDA GARRED & BRUCKER - Customer No. 007663
Date	January 19, 2005

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Typed or printed name	DAWN A. PRIVETT		
Signature		Date	January 19, 2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Case: NORTE-390Q2



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Shannon Mary Nelson)	
	)	Group No.: 2633
Serial No.: 09/544,762)	
	)	Examiner: Reza Sedighian
Filed: April 7, 2000)	
)	
For: Rugged Shock-Resistant)	
Backplane for Embedded Systems)	
_____)	

APPEAL BRIEF

Mail Stop APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Applicants/Appellants, of the above identified patent application, have appealed from final rejection of the claim of the subject application. This Brief on Appeal is filed in triplicate and is accompanied by the required Appeal Brief filing fee of \$500.00. AN ORAL HEARING IS NOT REQUESTED.

I. REAL PARTY IN INTEREST

The assignee of the application at issue is Northrop Grumman Corporation of Los Angeles, California, a Delaware corporation.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF CLAIM

The application at issue (Serial No. 09,544,762) (Exhibit 1) was filed on April 7, 2000. The application is a utility patent application constituting fourteen (14) claims.

On June 4, 2001 Applicant filed a Preliminary Amendment (Exhibit 2) to amend the specification to indicate that the present invention was made with Government support.

In the initial Office Action dated November 27, 2001 (Exhibit 3) the Examiner rejected Claims 1-14 under 35 USC §103(a), and Claim 13 under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-3, 5-6, 8-10 and 12-13 were rejected under 35 USC §103(a) as being unpatentable over Ishida (U.S. Patent No. 5,949,565) in view of Cern (U.S. Patent No. 5,815,298). Claims 4 and 11 are rejected under 35 USC §103(a) as bring unpatentable over Ishida (U.S. Patent No. 5,949,565) in view of Cern (U.S. Patent No. 5,815,298) and in further view of Croft et al. (U.S. Patent No. 5,864,708). Claims 7 and 14 were rejected under 35 USC §103(a) as being unpatentable over Ishida (U.S. Patent No. 5,949,565) in view of Cern (U.S. Patent No. 5,815,298) and in further view of Kobayashi (U.S. Patent No. 5,986,785, or Karstensen et al. (U.S. Patent No. 5,923,451.

In response to the Office Action (Exhibit 4) Applicant submitted an Amendment, dated March 5, 2002. Applicant amended Claims 1-5, 7-14 and added new independent Claim 15.

A final Office Action (Exhibit 5) was issued on July 25, 2002. In the Office Action the Examiner rejected Claims 1-15 under 35 USC §103(a).

Claims 1-3, 6-10, and 13-15 were rejected under 35 USC §103(a) as being unpatentable over Bishop (U.S. Patent No. 6,038,355 in view of Ozeki et al. (U.S. Patent No. 6,317,242).

Claims 7 and 14 were rejected under 35 USC §103(a) as being unpatentable over Bishop (U.S. Patent No. 6,038,355 in view of Ozeki et al. (U.S. Patent No. 6,317,242) in further view of Croft et al. (U.S. Patent No. 5,864,708). Claims 5 and 12 are rejected under 35 USC §103(a) as being unpatentable over Bishop (U.S. Patent No. 6,038,355 in view of Ozeki et al. (U.S. Patent No. 6,317,242) in further view of Barina (U.S. Patent No. 4,829,596).

In response to the final Office Action (Exhibit 6) Applicant submitted a further Amendment dated October 18, 2002. Applicant amended Claims 1, 8 and 15.

On November 19, 2002 the Examiner issued an Advisory Action (Exhibit 7) indicating that the proposed amendment(s) will not be entered because they raise new issues that would require further consideration and/or search.

Applicant filed a Request for Continued Examination in response to the Advisory Action on January 9, 2003 (Exhibit 8).

On April 11, 2003 the Examiner issued an Office Action (Exhibit 9), again rejecting Claims 1-15, now under 35 USC §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to responsibly convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1-2, 6-9, and 13-15 were rejected under 35 USC §103(a) as being unpatentable over Karstensen et al. (U.S. Patent No. 5,923,451) in view of Davidson (U.S. Patent No. 6,160,653). Claims 3-4, 10-11 were rejected under 35 USC §103(a) as being unpatentable over Karstensen et al. (U.S. Patent No. 5,923,451) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of Croft et al. (U.S. Patent No. 5,864,708). Claims 5 and 12 were rejected under 35 USC §103(a) as being unpatentable over Karstensen et al. (U.S. Patent No. 5,923,451)

in view of Davidson (U.S. Patent No. 6,160,653) and in further view of Barina (U.S. Patent No. 4,829,596).

In response to the Office Action (Exhibit 10) Applicant submitted an Amendment on June 26, 2003. Applicant amended Claims 1-3, 5-6, 8-13 and 15, cancelled Claims 7 and 14 and added new dependent Claim 16.

Applicant received a final Office Action dated September 30, 2003 (Exhibit 11), rejecting Claims 1-6, 8-13, 15 and 16 under 35 USC §103(a).

Claims 1-2, 6, 8-9, 13 and 15 were rejected under 35 USC §103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653). Claims 5 and 12 were rejected under 35 USC §103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of Barina (U.S. Patent No. 4,829,596). Claim 16 was rejected under 35 USC §103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) in further view of Cargin Jr. et al. (U.S. Patent No. 6,023,147).

In response to the Final Office Action (Exhibit 12) Applicant submitted an Amendment on December 26, 2003. Applicant amended Claims 1, 8 and 15.

On February 3, 2004 the Examiner issued an Advisory Action (Exhibit 13) indicating that the proposed amendment(s) will not be entered because they raise new issues that would require further consideration and/or search.

Applicant filed a Request for Continued Examination in response to the Advisory Action on February 23, 2004 (Exhibit 14).

Applicant then received a final Office Action (Exhibit 15) dated May 19, 2004, rejecting Claims 1-6, 8-13, 15 and 16 under 35 USC §112, second paragraph and 35 USC §103(a).

Claims 1-6 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-2, 6, 8-9, 13 and 15 were rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of William (U.S. Patent No. 3,858,154). Claims 3-4 and 10-11 are rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of William (U.S. Patent No. 3,858,154) and in further view of Croft et al. (U.S. Patent No. 5,864,708). Claims 5 and 12 are rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of William (U.S. Patent No. 3,858,154) and in further view of Barina (U.S. Patent No. 4,829,596). Claim 16 is rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of Cargin, Jr. et al. (U.S. Patent No. 6,023,147).

In response to the final Office Action, Applicant filed an Amendment (Exhibit 16) on September 20, 2004. Applicant amended Claims 1 and 8.

Applicant filed a Notice of Appeal and change of correspondence address (Exhibit 17) on November 19, 2004.

After filing the Notice of Appeal, Applicant then received a supplemental final Office Action (Exhibit 18) dated December 17, 2004 allowing entry of the amendment filed September 20, 2004, and rejecting Claims 1-6, 8-13, 15 and 16 under 35 USC §103(a).

Claims 1-2, 6, 8-9, 13 and 15 were rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653)

and in further view of William (U.S. Patent No. 3,858,154). Claims 3-4 and 10-11 are rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of William (U.S. Patent No. 3,858,154) and in further view of Croft et al. (U.S. Patent No. 5,864,708). Claims 5 and 12 are rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of William (U.S. Patent No. 3,858,154) and in further view of Barina (U.S. Patent No. 4,829,596). Claim 16 is rejected under 35 USC 103(a) as being unpatentable over Ahmad et al. (U.S. Patent No. 5,818,984) in view of Davidson (U.S. Patent No. 6,160,653) and in further view of Cargin, Jr. et al. (U.S. Patent No. 6,023,147).

In the supplemental final Office Action, the Examiner further cited additional references Estrada et al. (US Patent No. 5,611,022, col. 4, lines 32-35) and Reichardt et al. (US Patent No. 5,269,707, col. 1, lines 19-20) for supporting the rejection over Claims 1-2, 6, 8-9, 13 and 15.

V. SUMMARY OF INVENTION

An aspect of the current application is to provide optical interconnection between circuit cards to overcome the disadvantages of hardwire connection, including the complex circuitry design, disconnection due to shock and vibration, and the undesirable electromagnetic interference (EMI) and radio frequency interference (RFI) induced thereby.

Standardized infrared communication scheme developed by IrDA (infrared data association) is used to optically transmit and receive data between circuit cards. Due to the fact that such infrared communications schemes use air as a transmission medium, there is thus provided superior isolation and reduced heat dissemination between circuit cards.

As shown in Figure 1, the optical interconnection is achieved by providing a plurality of

circuit card connectors 18 disposed in space apart relation on a common backplane 16, a plurality of circuit cards 12 each being mounted to one of the circuit card connectors 18 (page 6, lines 18-26, Fig. 1), wherein each of the circuit cards 12 includes a dedicated pair of LED 22 and photodiode 24 operative to transmit and receive data from one another (page 9, lines 9-27, Fig. 2).

VI. ISSUES

The issues presented on Appeal are as follows:

(A) Whether Claims 1-2, 6, 8-9, 13 and 15 were improperly rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) [hereinafter “Ahmad”] in view of Davidson (US patent No: 6,160,653) [hereinafter “Davidson”] and in further view of William (US patent No: 3,858,154) [hereinafter “William”].

(B) Whether Claims 3-4 and 10-11 were improperly rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. in view of Davidson and in view of William and in further view of Croft et al (US patent No: 5,864,708) [hereinafter “Croft”].

(C) Whether Claims 5 and 12 were improperly rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. in view of Davidson and William and in further view of Barina (US patent No: 4,829,596) [hereinafter “Barina”].

(D) Whether Claim 16 was improperly rejected under 35 U.S.C. 103(a) as being unpatentable Ahmad et al. in view of Davidson and William and in further view of Cargin, Jr et al. (US patent No: 6,160,147) [hereinafter “Cargin”].

VI. GROUPING OF CLAIMS

All the pending claims are on appeal, in which Claims 1-2, 6, 8-9, 12 and 15 stand or fall together, Claims 3-4 and 10-11 stand or fall together, Claims 5 and 12 stand or fall together, and

Claim 16 stands separately from other claims.

VII. AUGUMENT

(A) The rejection of independent Claim 1 and dependent Claims 1-2, 6, 8-9, 13, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Ahmad in view of Davidson and in further view of William is in error, the rejection should be reversed, and the application should be remanded to the Examiner with instructions to allow Claims 1-2, 6, 8-9, 13 and 15.

The Examiner's Rejection

The Examiner contended that Ahmad discloses a shock-resistant system (10, fig. 1 and 32, fig 4) for interconnecting circuit cards (14g, 14h, fig 1 and 34, fig 4) to enable data transmitted and received therebetween (col. 3, lines 40-42, col. 5, lines 24-27), comprising: a common backplane (12, fig. 1 and 38, fig. 4) having a plurality of circuit card connectors (col. 3, lines 53-59 and 15, fig. 2) disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship (chips 14a-i are arranged in a parallel relationship with respect to each other); a plurality of circuit cards (14g, 14h, fig. 1 and 34, 36, fig. 4) each being mounted to one of the circuit card connectors (col. 3, lines 55-58).

In the supplemental Office Action dated December 17, 2004, the Examiner further relied on Estrada et al. (US patent No: 5,611,022, col. 4, lines 32-35) and Reichardt et al. (US Patent No: 5,269,707, col. 1, lines 19-20) for teaching the concept of considering a chip, or an integrated circuit as a circuit card or imposing a chip or an integrated circuit on a circuit card.

The Examiner admits that Ahmad differs from the claimed invention in that Ahmad does not specifically disclose the interconnected circuit cards being within a computer system. The Examiner cited Davidson as the teaching of the interconnection of optical circuit cards (100, 104,

fig. 8) within a computer system (col. 12, lines 14-28).

The Examiner also admits that Ahmad and Davidson differ from the claimed invention in that Ahmad and Davidson do not specifically disclose circuit cards being extended normal to a back plane. The Examiner therefore cited William for the teaching teaches a common backplane having a plurality of circuit card connectors disposed in spaced apart relationship for supporting circuit cards extending normal to the backplane (col. 1, lines 21-31 and figs. 1, 6). The Examiner concluded that it would be obvious to a person of ordinary skill in the art at the time of invention to provide a supporting structure, wherein circuit cards are extended normal to a backplane, as it is taught by William, in the modified optical data transmission system of Ahmad and Davidson in order to transmit the optical signal at a plurality of different paths and different directions.

A Review of Ahmad

Ahmad discloses optical transmission and reception used to effect interconnection of integrated circuits such as flip-chips mounted on a MCM (multi-chip-module) or PCB (printed circuit board). Optical transmitters (or emitters) and receiver are attached to or formed in the edge of each die or chip. (col. 2, lines 40-44). The object of the optoelectronic interconnection is to reduce costs for expensive fabrication process such as sputtering tungsten, silver, gold, etc, and enhance inter-chip signal speed and bandwidth (col. 1, lines 26-31).

Other advantages offered by the optical transmission includes: provides shortest possible horizontal path interconnection, reduce switching current surfaces, uses free space between chips or filled epoxy space as the transmissive media and **close proximity of the chips to avoid the use of radiation guide structures**; use of broad band electromagnetic radiation from a variety of sources; can be implemented through wafer fabrication process; allows components to be readily assembly with lateral alignment tolerance; and allows use of conventional solder bump and

reflow techniques.

Ahmad further discloses “*Although the present invention has been described in terms of optical interconnections between chips on the same microelectronic module, the concept of the present invention may be expanded to optical interconnections between adjacent modules*”.

As understood,

an integrated circuit or a chip is a semiconductor device that combines multiple transistors and other components and interconnects on a single piece of semiconductors;

a printed circuit board is a thin plate on which chips and other electronic components are placed. In a computer system, the printed circuit board is often referred as a circuit card, which is often categorized into motherboard, expansion card, daughter card, and network interface card; and

a MCM is an integrated circuit package that contains two or more interconnect chips, and it is well known in the art that in many applications, multiple MCM's are mounted to a single circuit card.

Ahmad discloses that optical interconnection between chips may be expanded to optical interconnections between adjacent modules, but fails to teach the optical interconnection between may be expanded to optical connections between adjacent circuit cards.

In col. 4, lines 32-39, Ahmad further discloses that “*it is highly preferably that the chips are spaced by a distance that will prevent overlapping of optical beams 24. ... Referring to FIG. 3, D refers the distance or spacing between chips. Preferably, D is between about 0.2mm and 2.0 mm.*” Such close proximity between chips to avoid overlapping of optical beams has been repetitively described throughout Ahmad.

As the multiple multi-chip modules can be arranged on the same circuit card with

distance or spacing between each other at 0.2 mm to 2.0 mm, Ahmad discloses that the optical interconnection may be expanded between adjacent modules too. However, as the circuit cards inserted into respective slots of a common backplane are always spaced with each other by a distance tens or hundred times of 2.0 mm to avoid contacts between components of adjacent circuit cards, it appears that the optical interconnection provided by Ahmad is not feasible to the spaced-apart circuit cards. Therefore, Ahmad discloses expanding the optical interconnection between adjacent modules only, but does not point out that the optical interconnection can also be applied between adjacent circuits.

In addition, it is well known in the art that the integrated circuits (chips) are heat generating devices, and the heat generated thereby has always been an important issue to be resolved in industry. When the chips are arranged with such small spacing, if the optically transmitted infrared radiation is used as the optical transmission between the chips, it is inevitable that such infrared radiation will be seriously interfered by the heat generated by the chips. As a result, a proper interconnection between the chips can not be achieved. Therefore, Ahmad actually teaches away use of infrared radiation.

Further, although Ahmad does not specifically discloses that the transmitters and the receivers of the same chip will transmit and receive signals at the same time, the expression of “prevent overlapping of optical beams 24 and FIG. 3A clearly express that the concurrence of signal transmission and reception of the same chip.

In page 7, line 21 to page 8, line 4, the specification as originally filed discloses that the infrared communication communications scheme utilized in the present invention may take any of a variety of the standard infrared protocols developed by the Infrared Data Association (IrDA). The teachings of the IrDA’s website at <http://www.irda.org/standards/standards.asp> have been

incorporated by reference. According to “IrDA communication protocol (IrCOMM)” published by Infrared Data Association in the above website, IrDA protocol sends one-way packets at a time. If a device tries to send data and listen for data at the same time, it would “hear” itself and not the device it wants to communicate with. The way IrDA devices achieve two-way communications is to take turns, also known as “turning the link around”. As the optical beams 24 for the alternate pairs of transmitters and receivers appear to exist simultaneously (Fig. 3), the optical interconnection disclosed by Ahmad cannot use IrDA protocol. That is, Ahmad teaches away IrDA protocol for communication.

A Review of Estrada et al and Reichardt et al.

In col. 4, lines 32-35, Estrada teaches “In further preferred embodiments, the controller 16 and memory devices 18 and 20 may be implemented on a single silicone chip or circuit card.” As understood, from the above teaching, either a single silicon chip or a circuit card may incorporate the controller 16 and memory devices 18 and 20 thereon. There is no teaching or even suggestion that a chip can be considered as a circuit card.

In col. 1, lines 16-20, Reichardt et al. discloses “The subscriber identity module comprises contact area (short: card contacts) which form a contact pattern, which typically corresponds to the contact pattern of an IC-card (chip card) in accordance with the ISO standard 7816. As known in the art that an IC-card is typically a card that has an IC or chip embedded therein, that is, an IC-card is the combination of a card and an IC (a chip) embedded in the card, not merely an IC or a chip.

A Review of Davidson

Davidson teaches using a set of optical fibers to form an optical computer bus. The object of Davidson is to use a new type of hardwire connection (optical fiber) to replace the

traditional type of hardwire connection, and thereby to provide dynamic allocation to different circuit cards in a faster speed.

Davidson does not show any desirability or motivation to eliminate the use of hardwire interconnection. On the contrary, Davidson teaches the advantages of using a specific type of hardwire interconnection.

A Review of William

William discloses a three dimensional packaging technique to facilitate implementation of direct electrical interconnections between printed circuit boards. Again, William does not show any desirability or motivation to eliminate the use of hardwire interconnection.

In re Independent Claims 1 and 8

In Claims 1 and 8 provide optical interconnection that is sole through air between adjacent circuit boards, while Ahmad discloses optical interconnection between chips and modules.

As discussed above, although Ahmad teaches that the optical interconnection between chips may be expanded to optical interconnection between adjacent modules, it does not suggest that optical interconnection may be expanded to that between the circuit cards. It is also not obvious for one of ordinary skill in the art, at the time the invention was made, to modify Ahmad from optical interconnection between chips into interconnection between circuit cards because Ahmad requires the chips or modules spaced with each other by a distance at 0.2 mm to 2.0 mm, while in practice, adjacent circuit cards mounted to a common backplane of a computer system often requires spacing between adjacent cards tens or hundreds of 2.0 mm. If the optical interconnection between chips is modified as optical interconnection between circuit cards, overlapping of optical beams between adjacent pairs of transmitters and receivers cannot be

prevented, and proper interconnection cannot be achieved between circuit cards.

Therefore, by specifically distinguishing the multi-chip-modules from printed circuit board and repetitively emphasizes the importance of the short spacing between chips, Ahmad does not provide any suggestion or motivation that the optical interconnection may be expanded to optical interconnection between circuit cards.

In addition, Ahmad does not teach the fixed relationship of the circuit cards to maintain continuous optical intercard communication between each of said circuit cards” as claimed in Claim 1.

Davidson teaches the advantages of using a specific type of hardwire (fiber) interconnection, while William teaches the 3-D packaging technique for printed circuit boards. Therefore, there is no suggestion or motivation for modifying the optical connection between chips into optical interconnection between circuit cards. A *prima facie* case of obviousness is not established.

With regard to Claims 2 and 9 and the independent Claim 15, as discussed above, Ahmad, Davidson and William further fail to teach that signals generated by the LEDs and photodiodes comprise optically transmitted infrared radiation. On the contrary, the close proximity between chips actually teaches away use of infrared radiation for communication between chips.

(B) The rejection of dependent Claims 3-4 and 10-11 under 35 U.S.C. § 103(a) as being unpatentable over Ahmad in view of Davidson and in view of William and in further view of Croft is in error, the rejection should be reversed, and the application should be remanded to the Examiner with instructions to allow Claims 3-4 and 10-11.

The Examiner admits that Ahmad, Davidson and William did not disclose the

transmission and reception signals comprise a standardized infrared communication scheme protocol that is developed by the infrared data association.

The Examiner relied on Croft for the teaching of the standardized infrared communication scheme protocol and combines Croft with Ahmad, Davidson and William to reject Claims 3-4 and 10-11.

As discussed above, IrDA protocol achieves two-way communication by turning the link around (IrDA protocol specification published in www.irda.org), that is, an IrDA device cannot send and receive data at the same time. If an IrDA device sends data and listens for data at the same time, it would hear itself and not the device it wants to communicate. Ahmad teaches the chips receives and sends signals at the same time, and therefore, teaches away the infrared communications scheme protocol as claimed in Claims 3-4 and 10-11. Thus, even Croft disclose use of infrared communications scheme protocol, there is no suggestion or motivation to modify Ahmad, Davidson and William to incorporate the infrared communication scheme protocol disclosed by Croft.

(c) The rejection of dependent Claims 5 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Ahmad in view of Davidson and in view of William and in further view of Barina is in error, the rejection should be reversed, and the application should be remanded to the Examiner with instructions to allow Claims 5 and 12.

Claims 5 and 12 are dependent on Claims 1 and 8 which comprise patentably distinguishable features from Ahmad, Davidson, William and Barina.

(D) The rejection of dependent Claim 16 under 35 U.S.C. § 103(a) as being

unpatentable over Ahmad in view of Davidson and in view of William and in further view of Cargin, Jr et al. (US Patent No. 6,023,147) is in error, the rejection should be reversed, and the application should be remanded to the Examiner with instructions to allow Claim 16.

The Examiner admits that Ahmad, Davidson and William do not disclose the computer system includes a hand-held data collection device. As a matter of fact, none of Ahmad, Davidson and William shows the desirability of interconnection between circuit cards within a hand-held data collection device. Cargin teaches a programmable controller with fiber optic input/output module. Again, there is no desirability of optical interconnection between circuit boards within a hand-held data collection device.

VIII. CONCLUSION

For the foregoing reasons, Applicant believes the application satisfies requirements of 35 USC §103 (a).

Notwithstanding the foregoing, Applicant expresses its appreciation for the courteous assistance of the Examiner in attempting to resolve, albeit unsuccessfully, the outstanding matters in relation to this application.

Respectfully submitted,

Date: Jan 19, 2005 By: _____
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-1-

Case No.: NORTH-390A/A-2241

5 RUGGED SHOCK-RESISTANT BACKPLANE FOR EMBEDDED SYSTEMS
CROSS-REFERENCE TO RELATED APPLICATIONS

(Not Applicable)

STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT

(Not Applicable)

10

BACKGROUND OF THE INVENTION

Embedded or enclosed systems for housing electronic components, such as a computer chassis, that are designed to withstand high shock and vibration are well-known in the art. Exemplary of such prior-art enclosures include those
15 environmental enclosures disclosed in United States Patent Nos. 5,309,315 and 5,570,270, issued on May 3, 1994 and October 29, 1996, respectively, to Nadell et al., entitled SEVERE ENVIRONMENT ENCLOSURE WITH THERMAL HEAT SINK AND EMI PROTECTION, the teachings of which are expressly
20 incorporated herein by reference. Additionally exemplary of such prior-art apparatus include those enclosures disclosed in United States Patent No. 5,381,314 issued on January 10, 1995 to Rudy, Jr. et al., entitled HEAT DISSIPATING EMI/RFI PROTECTIVE FUNCTION BOX, the teachings
25 of which are likewise incorporated herein by reference.

In this regard, such devices are typically designed to house computer systems for use in predominantly embedded applications in severe environments. With respect to the latter, it is well-recognized in the art that a severe
30 environment is generally defined as one subject to large environmental extremes due to temperature, humidity, radiation, electromagnetic induction, shock and vibration. Additionally, an embedded application is generally accepted as meaning a specific function or functions, which are
35 contained within a larger application, and requires no

human intervention beyond supplying power to the computer. Exemplary of such embedded applications include systems and process controls, communications, navigations, and surveillance.

5 In order to properly function and perform such applications, it is critical that the computer and other electronic components housed within such enclosures be constructed, supported and enclosed in such a way as to be able to withstand such severe conditions. Typically, the
10 primary focus of such prior-art enclosures is to provide a structurally sound enclosure for an array of individual circuit boards or daughter cards in a backplane assembly to which the circuit boards are electrically connectable and disconnectable, to thus define a card cage. Despite the
15 best efforts that can be made with respect to properly arranging such circuit cards, however, an inherent problem in all such embedded systems arises from the use of wiring between circuit cards, which is necessary to interconnect such circuit cards for data transfer. Specifically, hard-
20 wired connections are known to become disconnected when subjected to extremes in shock and vibration. The use of wire conductor for interconnecting circuit cards also typically generates undesirable electromagnetic interference (EMI) and radio frequency interference (RFI).
25 In addition to the undesirable effects and potentially unsound structural arrangement by which prior-art circuit cards are housed interconnected within an embedded system are the complications that arise from designing such systems. As it is well-known in the art, circuit cards can
30 and oftentimes do operate at multiple voltages, which thus requires complex circuitry design in order to enable a plurality of circuit cards to be interconnected with one another. In this respect, to the extent fluctuating voltages are utilized in a given interconnected system,
35 those circuit cards incapable of operating at such higher

voltages become inoperative due to the incompatible voltage interface.

As such, there is a substantial need in the art for a system and method for operatively interconnecting a plurality of circuit cards with one another within an embedded system that can withstand severe environments to a greater degree than prior art system and methods. Likewise, there is a substantial need in the art for such systems and methods that can produce greater reliability, can be implemented utilizing existing technology, and allows for substantially more simplified circuitry design than prior art systems and methods.

BRIEF SUMMARY OF THE INVENTION

The present invention specifically addresses and alleviates the above-identified deficiencies in the art. In this regard, the present invention is directed to systems and methods for interconnecting a plurality of modules, namely circuit boards or daughter cards, in an embedded environment that have increased reliability, can withstand shock and vibration, and provide greater electrical isolation between such modules than prior art methods and systems.

In a preferred embodiment, the system comprises the use of a standardized infrared communication scheme, and in particular one or more schemes developed by the Infrared Data Association, or IrDA, to optically transmit and receive data between modules. In this regard, each respective one of a plurality of modules comprising an embedded computer system is provided with an LED and photodiode to optically transmit and receive signals to thus provide a wireless connection between such modules. Due to the fact that such infrared communications schemes typically use air as a transmission medium, there is thus provided superior electrical isolation and reduced heat

dissemination between modules. Additionally, because wiring connections need not be formed, the systems and methods of the present invention are able to mitigate damage imparted by the shock transferred from circuit card to circuit card insofar as such physical activity is known in the art to cause prior art wire connections to break or otherwise become defective. Moreover, by utilizing infrared communication schemes, the systems and methods of the present invention can transmit data at high speed, which are currently known in the art to function at 4 Mbps (megabits per second), and may eventually exceed 16 megabits per second.

It is therefore an object of the present invention to provide a system and method for electrically interconnecting a plurality of circuit cards with one another within an embedded system that can withstand severe environments to a greater degree than prior art system and methods.

Another object of the present invention is to provide a system and method for operatively interconnecting a plurality of circuit cards with one another with an embedded system that, in addition to being able to withstand severe environmental conditions, further provides electrical isolation between modules or circuits than prior art systems and methods.

Another object of the present invention is to provide a system and method for operatively interconnecting a plurality of circuit cards with one another within an embedded system that has greater reliability than prior-art systems and methods, particularly with respect to performing data transfer functions.

Another object of the present invention is to provide a system and method for operatively interconnecting a plurality of circuit cards with one another within an embedded system that are operative to facilitate high speed

communication between system modules or circuit cards contained within such system.

Still further objects of the present invention are to provide a system and method for operatively interconnecting a plurality of circuit cards with one another within an embedded system that is of simple and durable construction, relatively inexpensive to design and fabricate, may be readily designed and implemented using conventional technology, and is more effective and efficient than prior art systems and methods.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

These, as well as other features of the present invention, will become more apparent upon reference to the drawings, wherein:

Fig. 1 is an exploded view of an enclosure depicting a circuit card positionable therewithin.

Fig. 2 is a perspective, partial cross-sectional view of a plurality of modules of an embedded computer system having dedicated pairs of LED and photodiodes formed thereon for transmitting and receiving data between said modules.

DETAILED DESCRIPTION OF THE PRESENT EMBODIMENT

The detailed description as set forth below in connection with the appended drawings is intended as a description of the presently preferred embodiments of the invention, and is not intended to represent the only form in which the present invention may be constructed or utilized. The description sets forth the functions and sequences of steps for constructing and operating the invention in connection with the illustrated embodiments. It is understood, however, that the same or equivalent functions and sequences may be accomplished by different embodiments and that they are also intended to be

encompassed within the scope of this invention.

Referring now to the figures, initially to Fig. 1, there is shown an exploded view of an environment enclosure 10 for housing a computer system for use in running
5 embedded applications in severe environments. As is well-known to those skilled in the art, such enclosures 10 are capable of withstanding extreme environmental conditions, such as maximum extremes of shock, vibration, temperature, EMI, humidity, as well as sand, dust, and the like. Such
10 containers are particularly effective in running embedded applications, which are defined as a specific function which is contained within a larger application requiring no human intervention beyond supplying power to the computer (not shown) housed therewithin. For example, embedded
15 applications include but not limited to, systems and process control, communications, navigation, and surveillance.

The computer systems utilized to run such application typically comprise a plurality of circuit boards or
20 daughter cards, such as 12, that are affixed about a backplane 16 rigidly mounted within the enclosure. In this respect, the backplane is provided with a plurality of connectors 18 for supporting a plurality of circuit cards in generally parallel, upright relationship. The backplane
25 16 also supports the power supply (not shown), which is typically located within such enclosure 10, to thus provide power for the computer system to function.

In prior art systems, the circuit cards are typically hard wired to one another to enable data to be transmitted
30 and received therebetween. The use of hard-wire electric connections, however, is known to have several drawbacks. In this regard, hard wiring is known to be unreliable, particularly when subjected to severe shock and vibration insofar as such forces cause the wire connections between
35 circuit cards to break. Moreover, hard wiring creates

undesirable EMI and RFI that can interfere with computer operations. Moreover, because the various circuit cards deployed in such enclosed computer systems often operate at different voltages, hard wiring creates significant design problems insofar as painstaking efforts must be made to ensure that the voltage by which each of the circuit cards functions does not exceed operative levels, while at the same time being sufficient to run desired applications.

To address such problems, there is provided herein a novel communications scheme by which circuit cards can be interconnected to one another to transmit and receive data that eliminates the foregoing drawbacks. In this respect, there is provided herein an infrared communications scheme that interconnects the plurality of circuit cards of an embedded computer system to thus enable data to be received and transmitted optically therebetween. In particular, each respective one of the plurality of the circuit cards is provided with a dedicated LED and photodiode pair that enables data signals to be transmitted typically through air, as opposed to a hard wire connection.

The infrared communications scheme utilized in the present invention may take any of a variety of the standard infrared protocols developed by the Infrared Data Association, also known as IrDA. As is well-known to those skilled in the art, the IrDA has created interoperable, low-cost infrared data interconnection standards that support a broad range of applications for use in computing and communications devices. Advantageously, IrDA standards are ideally recommended for high speed, short range, line of sight, point-to-point cordless data transfer, which are typically utilized in widespread commercial applications for personal computers, digital cameras, hand-held data collection devices, and the like. A more detailed outline of the standards and protocols designed and developed by the IrDA may be obtained from the Infrared Data Association

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based in Walnut Creek, California. Alternatively, such data may be obtained via the IrDA's website at <http://www.irda.org/standards/standards.asp>, the teachings of which are expressly incorporated herein by reference.

5 As will be appreciated by those skilled in the art, the use of standardized IrDA infrared communications schemes currently can enable data to be received and transmitted at rates up to four megabits per second (4 Mbps), which is substantially equivalent, if not faster,
10 than conventional hard-wired systems. It is further contemplated that developments may soon be made which can support data transfer rates in excess of sixteen megabits per second (16 Mbps).

As will further be appreciated by those skilled in the
15 art, by virtue of the fact that infrared communications schemes enable data to be transmitted and received optically, the need for hard-wire connections will thus be eliminated. As such, the systems and methods of the present invention have substantially increased reliability
20 as compared to conventional hard-wire connections, which are known to deteriorate and eventually become disconnected when subjected to high shock or vibrational activity. Moreover, because the transmission medium for infrared communications system typically is air, there is thus
25 provided greater electrical isolation, namely shielding from EMI and RFI, that cannot otherwise be provided via hard-wire connections.

Given the widespread availability of IrDA standards and protocols, it will be readily appreciated by those
30 skilled in the art that a variety of LED and photodiode arrangements are already commercially available that may be implemented to facilitate the transfer of data amongst circuit cards. As such, one skilled in the art would easily be able to pick and choose which particular IrDA
35 infrared communication scheme may be appropriate for a

given application. Advantageously, because of the fact that such infrared communication schemes transmit data optically typically through air, designers and engineers need not make appropriate adjustments in the various
5 voltages at which differing circuit cards operate, which thus enables systems to be designed and implemented in a far easier manner than conventional embedded systems using hard-wire connections.

Figure 2 depicts an example of how one such possible
10 physical implementation of an IrDA infrared communications scheme may be implemented according to a preferred embodiment of the present invention. As illustrated, multiple modules 20 representing circuit boards, daughter cards, and the like, having dedicated pairs of LEDs 22 and
15 photodiodes 24 formed thereon, are arranged such that the same are optically operative to transmit and receive data from one another. In this respect, so long as an optical pathway can be established between the respective LED and photodiodes 22, 24 of each respective module 20, the
20 ability of each respective module 20 to interconnect with one another will be maintained. Indeed, it will be recognized by those skilled in the art that the use of LEDs and photodiodes in transmitting data optically provides for a broader range of coverage and can thus withstand stresses
25 and strains in the underlying backplane structure than would conventional wiring schemes utilized with embedded computer systems.

It is to be further understood that various additions, deletions, modifications and alterations may be made to the
30 above-described embodiments without departing from the intended spirit and scope of the present invention. Accordingly, it is intended that all such additions, deletions, modifications and alterations be included within the scope of the following claims.

CLAIMS

1. A shock-resistant system for operatively interconnecting modules within a computer system to enable data to be transmitted and received therebetween
5 comprising:
 - a. a first module having a first LED and a first photodiode respectively formed thereon;
 - b. a second module having a second LED and a second photodiode respectively formed thereon; and
 - 10 c. wherein said first and second modules are maintained in fixed relationship to one another such that said first photodiode on said first module is operative to receive a signal produced from said second LED of said second module and said second
15 photodiode is operative to receive signals from said first LED of said first module.
2. The system of Claim 1 wherein said signals generated by said first and second LEDs and received by said first and second photodiodes comprised optically
20 transmitted infrared radiation.
3. The system of Claim 2 wherein said transmission and reception of signals between said first and second LED's and said first and second photodiodes comprise a standardized infrared communications scheme protocol.
- 25 4. The system of Claim 3 wherein said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.
5. The system of Claim 1 wherein said first and second modules are housed within an enclosure.
- 30 6. The system of Claim 1 wherein said first and second modules are operative to run an embedded application.
7. The system of Claim 1 wherein said system comprises a multiplicity of modules wherein each respective
35 one of said multiplicity of modules has a dedicated LED and

photodiode formed thereon, each respective one of said multiplicity of modules being operative to transmit and receive data via said LED and photodiode formed thereon with the respective other modules of said multiplicity of modules.

8. A method for operatively interconnecting modules within a computer to enable data to be transmitted and received therebetween comprising:

a. providing a first module having at least one first transmitter LED diode and receiver photodiode formed thereon;

b. providing a second module having a second LED and a second photodiode respectively formed thereon; and

c. spatially arranging said first module relative to said second module such that first photodiode on said first module is operative to receive a signal produced from said second LED of said second module and said second photodiode is operative to receive signals from said first LED of said first module.

9. The method of Claim 8 wherein in step c), said signals generated by said first and second LEDs and received by said first and second photodiodes comprise optically transmitted infrared radiation.

10. The method of Claim 8 wherein in step c), said transmission and reception of signals between said first and second LEDs and said first and second photodiodes comprise a standardized infrared communications scheme protocol.

11. The method of Claim 8 wherein in step c), said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. The method of Claim 8 wherein in step c), said first and second modules are housed within an enclosure.

13. The method of Claim 8 wherein in step c), said first and second circuit cards are operative to run an embedded application.

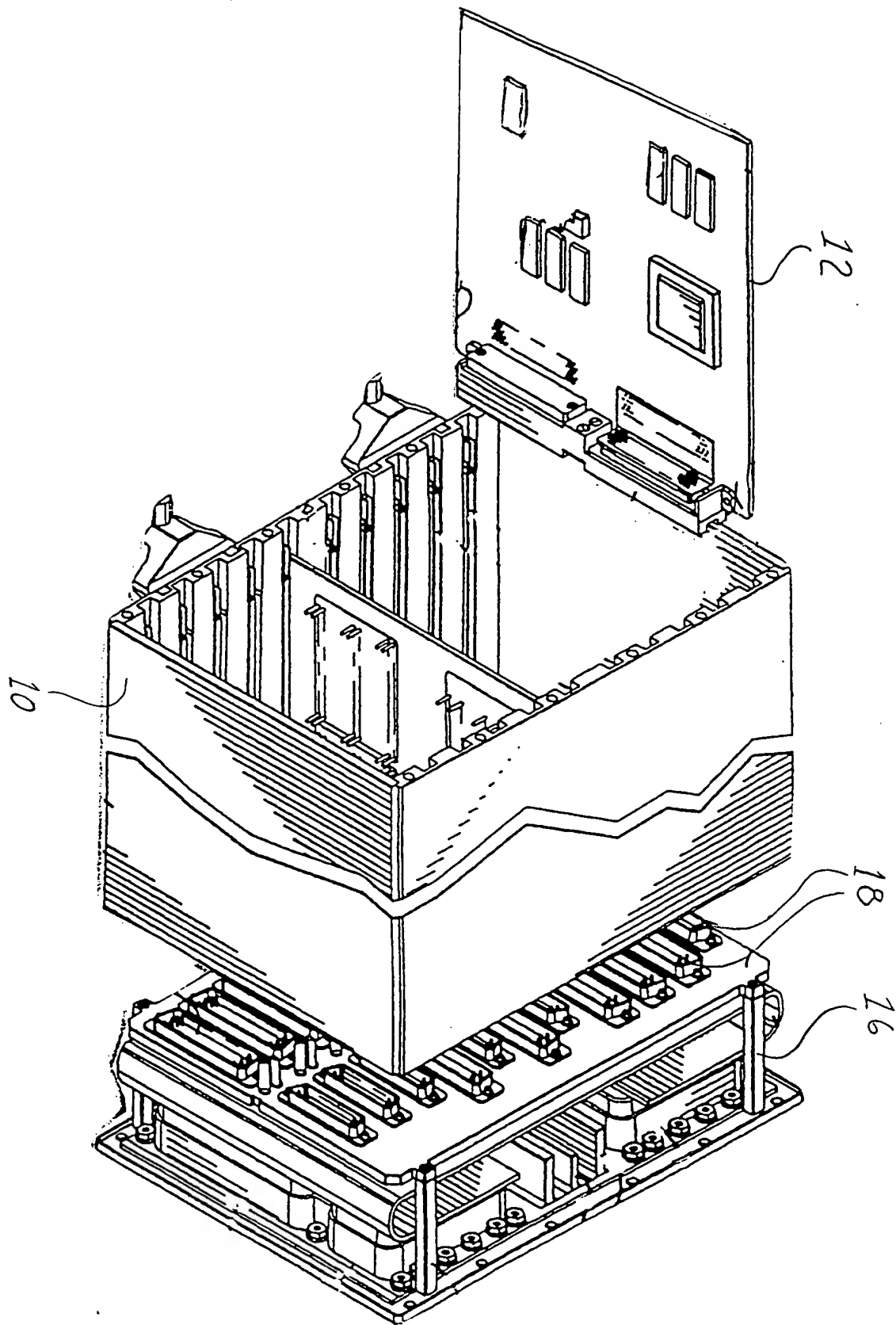
14. The method of Claim 8 wherein in step c), said
5 system comprises a multiplicity of modules wherein each
respective one of said multiplicity of modules has a
dedicated LED and photodiode formed thereon, each
respective one of said multiplicity of modules being
operative to transmit and receive data via said LED and
10 photodiode formed thereon with the respective other modules
of said multiplicity of modules.

ABSTRACT OF THE DISCLOSURE

Infrared communications scheme for use in an embedded system. According to a preferred embodiment, the invention comprises the use of an infrared communications scheme, 5 according to IrDA protocol, which is utilized to transmit and receive data optically between circuit cards housed within an enclosed, embedded system. Preferably, each respective circuit card is provided with an LED and photodiode to respectively transmit and receive data 10 optically. As such, wire connections are eliminated and allows the systems and methods of the present invention to withstand a greater degree of vibration and shock than that of the prior-art systems and methods. Moreover, the systems and methods of the present invention provide 15 increased reliability and provide greater electrical isolation between modules than prior-art systems and methods.

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Fig. 1



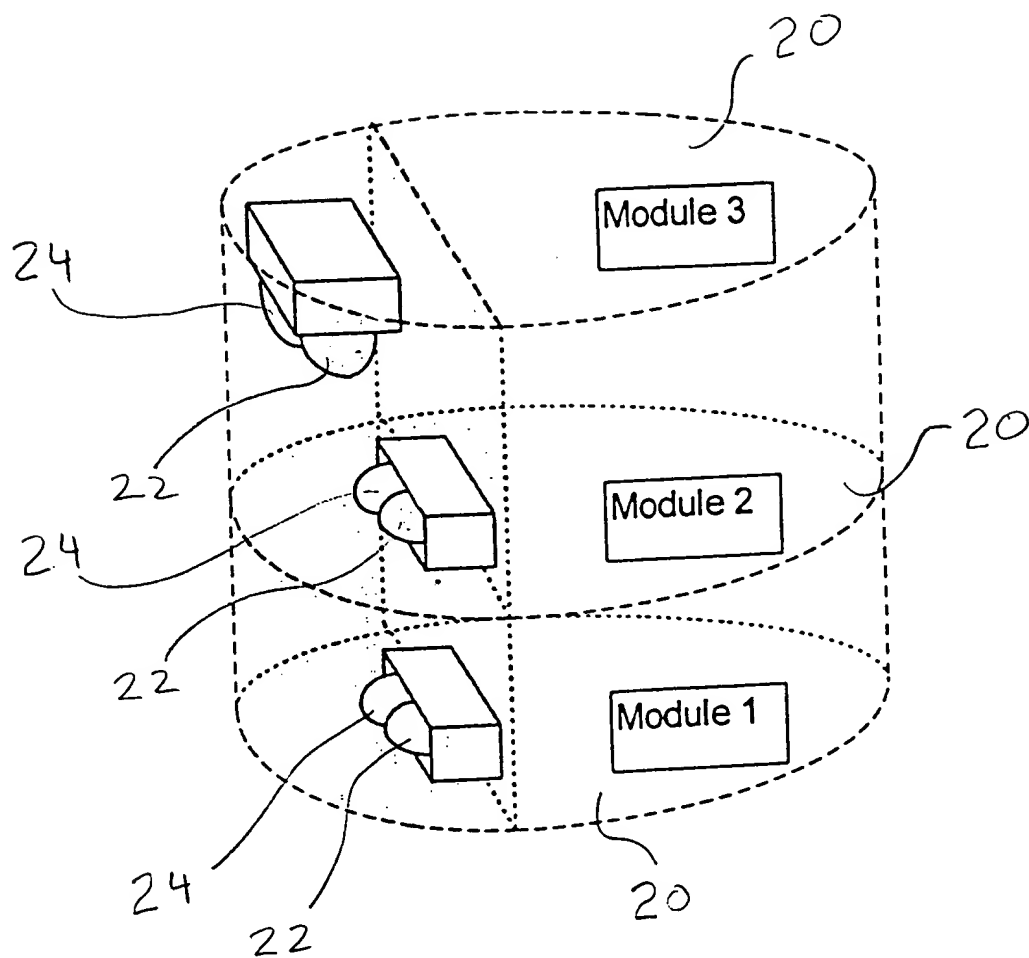


Fig. 2

Case No.: NORTH-390A/A-2241



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Shannon Mary Nelson)
et al.)
Serial No.: 09/544,762) Group No.: 2835
Filed: April 7, 2000) Examiner: Unknown
For: RUGGED SHOCK-RESISTANT)
BACKPLANE FOR EMBEDDED)
SYSTEMS)

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON D C 20231

Dear Sir/Madam:

Applicants hereby request that the present application be amended as follows:

IN THE SPECIFICATION:

On page one, please insert the following in the section entitled "STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT":

--STATEMENT OF GOVERNMENT RIGHTS

This invention was made with Government Support under contract N66001-98-C-8518 awarded by the United States Navy. The Government has certain rights in this invention.--

REMARKS

By the present Preliminary Amendment, Applicants have simply amended the specification of the present application to indicate that the present invention was made with Government support pursuant to a contract awarded by the United States Navy, therefore imparting certain rights in the present invention to the Government.

Applicants respectfully request that the present Preliminary Amendment be considered and entered in relation to the present application.

Respectfully submitted,

Date: 6/4/01

By:



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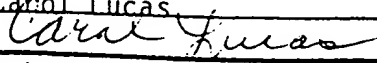
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/544,762	
	Filing Date	April 7, 2000	
	First Named Inventor	Shannon Mary Nelson et al.	
	Group Art Unit	2835	
	Examiner Name	Unknown	
Total Number of Pages in This Submission	3	Attorney Docket Number	NORTH-390A/A-2241

ENCLOSURES (check all that apply)		
<input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment / Response Preliminary <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition Routing Slip (PTO/SB/69) and Accompanying Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Small Entity Statement <input type="checkbox"/> Request for Refund	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Additional Enclosure(s) (please identify below): 1. Return Postcard.
Remarks: PLEASE SEND ALL CORRESPONDENCE TO: Terry J. Anderson, Esq. NORTHROP GRUMMAN CORPORATION 1840 Century Park East Los Angeles, CA 90067-2199 (310) 332-5666		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Bruce B. Brunda STETINA BRUNDA GARRED & BRUCKER
Signature	
Date	June 4, 2001

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Stetina Brunda Garred & Brucker

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No.: 09/544,762

Date: April 7, 2000

Title:

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Papers transmitted herewith: Preliminary Amendment; Transmittal
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590 11/27/2001
Terry J Anderson Esq
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Los Angeles, CA 92677-2199



EXAMINER

SEDIGHIAN, REZA

ART UNIT PAPER NUMBER

2633

DATE MAILED: 11/27/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

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PATENT DEPARTMENT

Office Action Summary

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

Mohammad R Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 July 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5. 6) ☐ Other: _____

Art Unit: 2633

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 13, it recites the limitation "said first and second circuit cards" in line 2.

There is insufficient antecedent basis for this limitation in the claim.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 5-6, 8-10 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (US Patent No: 5,949,565) in view of Cern (US Patent No: 5,815,298).

Regarding claims 1 and 8, Ishida discloses a shock-resistant system (col. 4, lines 10-30, 54-67, col. 5, lines 1-27) for interconnecting modules (47, 48, fig. 3) within a computer system (1, 2, 3, fig. 3) to enable data to be transmitted and received therebetween (col. 2, lines 1-3, col. 5, lines 55-67), comprising: a first module having an LED (47, fig. 3), and a second module having a photodiode (48, fig. 3), wherein the first and second modules are maintained in fixed relationship to one another (col. 6, lines 38-46). Ishida differs from the claimed invention in that Ishida does not specifically disclose the first module having a first LED and a first photodiode, and the second module having a second LED and a second photodiode. Cern discloses an optical

communication system (col. 3, lines 60-67, col. 4, lines 1-20 and fig. 1) comprised of stations (A, B, fig. 1) that each includes optical transceiver modules (10, fig. 1) such that a first photodiode (12, station A) on the first module (10, station A) is operative to receive a signal produced from a second LED (14, station B) of the second module (10, station B), and a second photodiode (12, station B) is operative to receive signals from a first LED (14, station A) of the first module (10, station A). Therefore, it would have been obvious to an artisan at the time of invention to incorporate optical transceiver modules such as the one of Cern for the optical transmission and optical reception modules in the electronic apparatus of Ishida in order to provide a bi-directional optical transmission of data between a first unit and a second unit within a computer system.

Regarding claims 2 and 9, Cern further discloses optically transmitted infrared radiation (col. 1, lines 40-60).

Regarding claims 3 and 10, Ishida further discloses the transmission and reception signals comprise a standardized infrared communication scheme protocol (col. 6, lines 47-50).

Regarding claims 5 and 12, Ishida further discloses first and second modules (47, 49, fig. 3) are housed within an enclosure (col. 3, lines 65-67, col. 4, lines 1-2, 31-39 and 2, 3, fig. 3).

Regarding claims 6 and 13, Ishida discloses the first and second modules are operative to run an embedded application (col. 2, lines 64-67, col. 3, lines 1-5, col. 9, lines 13-22).

5. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (US Patent No: 5,949,565) in view of Cern (US Patent No: 5,815,298) and in further view of Croft et al. (US Patent No: 5,864,708).

Regarding claims 4 and 11, the combination of Ishida and Cern further differs from the claimed invention in that Ishida and Cern do not specifically disclose the infrared communication protocol is developed by the infrared data association. Croft discloses wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Infrared Data Association standards or protocols such as the one discussed by Croft for the infrared data transmission and reception in the modified optical communication systems of Ishida and Cern in order to provide a reliable method of data transmission by implementing a standard Infrared protocol to detect transmission errors and to avoid collisions.

6. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (US Patent No: 5,949,565) in view of Cern (US Patent No: 5,815,298) and in further view of Kobayashi (US Patent No: 5,986,785), or Karstensen et al. (US Patent No: 5,923,451).

Regarding claims 7 and 14, the combination of Ishida and Cern further differs from the claimed invention in that Ishida and Cern do not specifically disclose the system comprises a multiplicity of modules each having an LED and a photodiode formed thereon and the modules being operative to transmit and receive data via LEDs and photodiodes. Kobayashi discloses an electronic apparatus to send and receive data (col. 2, lines 35-38), wherein a plurality of transceiver modules (24, 25, fig. 3) are interfaced to one another (col. 3, lines 27-32 and fig. 3). Karstensen discloses an electronic apparatus with optical communication capability (col. 1, lines 5-10), wherein a plurality of transceiver modules are interfaced to one another (2, fig. 1 and 4, 5

Art Unit: 2633

fig. 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate optical transceiver modules that are interfaced to one another such as the one of Kobayashi or Karstensen in the modified communication system of Ishida and Cern in order to provide an optical transmission system in which multiple requests can be retained, stored or resent and digital information can be routed, processed, and transmitted optically between multiple points.


7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kim et al. (US patent No : 6,256,129) is cited to show to a portable computer (10, figs. 1, 2) using an infrared transceiver unit (11, fig. 2) in communication with a peripheral device (30, fig. 2) having the same infrared transceiver unit (32, fig. 2).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad R Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.


JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Complete if Known

Application Number	09/544,762
Filing Date	April 07, 2000
First Named Inventor	Shannon Mary Nelson
Group Art Unit	unknown 2633
Examiner Name	unknown N.R. SEDIGHIAN
Attorney Docket Number	NORTH-390A

(use as many sheets as necessary)

Sheet		of	
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U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
MRS		5,863,211		Sobotta et al.	01/26/99	
MRS		5,852,517		Gerber et al.	12/22/98	
MRS		5,850,189		Sakanaka et al.	12/15/98	
MRS		5,794,164		Beckert et al.	08/11/98	
MRS		5,783,777		Kruse et al.	07/21/98	
MRS		5,737,690		Gutman	04/07/98	
MRS		5,737,107		Umeda	04/07/98	
MRS		5,617,236		Wang et al.	04/01/97	
MRS		5,546,211		Devon	08/13/96	
MRS		5,428,507		Chatel et al.	06/27/95	
MRS		5,388,995		Rudy, Jr. et al.	02/14/95	
MRS		5,381,314		Rudy, Jr. et al.	01/10/95	
MRS		5,376,011		Rudy, Jr. et al.	12/27/94	
MRS		5,348,482		Rudy, Jr. et al.	09/20/94	
MRS		5,343,361		Rudy, Jr. et al.	08/30/94	
MRS		4,790,762		Harm, deceased et al.	12/13/88	
MRS		4,751,479		Parr	06/14/88	
MRS		5,570,270		Naedel et al.	10/29/96	
MRS		5,430,615		Keeth et al.	07/04/95	
MRS		5,309,315		Naedel et al.	05/03/94	

[illegible]

Date Considered	11/16/0
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¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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Notice of References Cited

Application/Control No.

09/544,762

Applicant(s)/Patent Under

Reexamination

NELSON ET AL.

Examiner

Mohammad R Sedighian

Art Unit

2633

Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number	Date	Name	Classification	
		Country Code-Number-Kind Code	MM-YYYY			
	A	US-5,949,565	09-1999	Ishida	359	154
	B	US-5,815,298	09-1998	Cern	359	152
	C	US-6,256,129	07-2001	Kim et al.	359	159
	D	US-5,923,451	07-1999	Karstensen et al.	359	163
	E	US-5,986,785	11-1999	Kobayashi	359	152
	F	US-5,864,708	01-1999	Croft et al.	395	821
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	H	US-				
	I	US-				
	J	US-				
	K	US-				
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	M	US-				

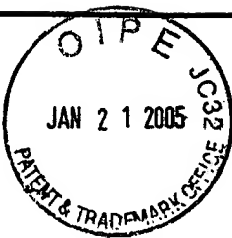
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	N						
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	Q						
	R						
	S						
	T						

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



ATTORNEY DOCKET:
NORTH-390A
Serial No. 09/544,762
Filed: April 7, 2000

Certificate of Mailing under 37 CFR 1.8 or 37 CFR 1.10

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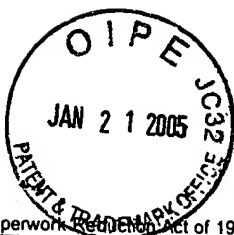
on March 5, 2002
(Date)

Cheri L. Brettmann
Signature

Cheri L. Brettmann
Typed or printed name of person signing Certificate

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1. Transmittal (1 page);
2. Fee Transmittal (1 page) (in duplicate);
3. Petition for Extension of Time Under 37 CFR 1.136(a) (1 page);
4. Amendment of 24 Pages (Including Marked-up Version); and
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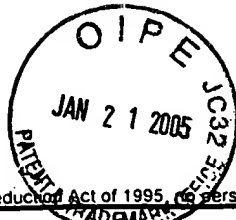
TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/544,762	
	Filing Date	04/07/2000	
	First Named Inventor	Shannon Mary Nelson	
	Group Art Unit	2633	
	Examiner Name	Sedighian, R.	
Total Number of Pages in This Submission	29	Attorney Docket Number	NORTH-390A/ A-2241

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Assignment Papers (for an Application)	<input type="checkbox"/> After Allowance Communication to Group
<input type="checkbox"/> Fee Attached	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input checked="" type="checkbox"/> Amendment / Reply	<input type="checkbox"/> Licensing-related Papers	<input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)
<input type="checkbox"/> After Final	<input type="checkbox"/> Petition	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/declaration(s)	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Status Letter
<input checked="" type="checkbox"/> Extension of Time Request	<input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address	<input checked="" type="checkbox"/> Other Enclosure(s) (please identify below):
<input type="checkbox"/> Express Abandonment Request	<input type="checkbox"/> Terminal Disclaimer	
<input type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> Request for Refund	
<input type="checkbox"/> Certified Copy of Priority Document(s)	<input type="checkbox"/> CD, Number of CD(s) _____	
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<input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53		
Remarks		Certificate of Mailing (1 page) Return Postcard
Please direct all correspondence to: Terry Anderson 1840 Century Park East, Los Angeles, California, 90067-2199		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Bruce B. Brunda STETINA BRUNDA GARRED & BRUCKER
Signature	
Date	03/05/2002

CERTIFICATE OF MAILING			
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Typed or printed name	Cheri L. Brettmann		
Signature		Date	03/05/2002

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PTO/SB/17 (10-01)

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FEE TRANSMITTAL for FY 2002

Patent fees are subject to annual revision.

Complete if Known

Application Number	09/544,762
Filing Date	04/07/2000
First Named Inventor	Shannon Mary Nelson
Examiner Name	Sedighian, R.
Group Art Unit	2633
Attorney Docket No.	NORTH-390A/ A-2241

TOTAL AMOUNT OF PAYMENT (\$ 110.00)

METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number: 19-4330
Deposit Account Name: STETINA BRUNDA GARRED AND BRUCKER

☐ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

☐ Applicant claims small entity status See 37 CFR 1.27

2. ☒ Payment Enclosed:

☐ Check ☐ Credit card ☐ Money Order ☒ Other

FEE CALCULATION**1. BASIC FILING FEE**

Large Entity Code	Small Entity Code	Fee (\$)	Fee (\$)	Fee Description	Fee Paid
101	740	201	370	Utility filing fee	
106	330	206	165	Design filing fee	
107	510	207	255	Plant filing fee	
108	740	208	370	Reissue filing fee	
114	160	214	80	Provisional filing fee	

SUBTOTAL (1) (\$)

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Code	Small Entity Code	Fee (\$)	Fee (\$)	Fee Description
103	18	203	9	Claims in excess of 20
102	84	202	42	Independent claims in excess of 3
104	280	204	140	Multiple dependent claim, if not paid
109	84	209	42	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity Code	Small Entity Code	Fee (\$)	Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for ex parte reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	110.00
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	920	217	460	Extension for reply within third month	
118	1,440	218	720	Extension for reply within fourth month	
128	1,960	228	980	Extension for reply within fifth month	
119	320	219	160	Notice of Appeal	
120	320	220	160	Filing a brief in support of an appeal	
121	280	221	140	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,280	241	640	Petition to revive - unintentional	
142	1,280	242	640	Utility issue fee (or reissue)	
143	460	243	230	Design issue fee	
144	620	244	310	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Processing fee under 37 CFR 1.17(q)	
126	180	126	180	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	740	246	370	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	740	249	370	For each additional invention to be examined (37 CFR § 1.129(b))	
179	740	279	370	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 110.00)

SUBMITTED BY

Name (Print/Type): Bruce B. Brunda
Signature: *Bruce B. Brunda*

Registration No. 28,497
(Attorney/Agent)

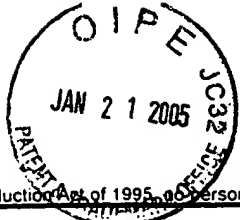
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Telephone: (949) 855-1246

Date: 3/5/02

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PTO/SB/17 (10-01)

Approved for use through 10/31/2002. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL for FY 2002

Patent fees are subject to annual revision.

TOTAL AMOUNT OF PAYMENT

(\$) 110.00

Complete if Known

Application Number	09/544,762
Filing Date	04/07/2000
First Named Inventor	Shannon Mary Nelson
Examiner Name	Sedighian, R.
Group Art Unit	2633
Attorney Docket No.	NORTH-390A/ A-2241

METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit
Account
Number

19-4330

Deposit
Account
NameSTETINA BRUNDA GARRED
AND BRUCKER

☐ Charge Any Additional Fee Required
Under 37 CFR 1.16 and 1.17

☐ Applicant claims small entity status.
See 37 CFR 1.27

2. ☒ Payment Enclosed:

☐ Check ☐ Credit card ☐ Money
Order ☒ Other

FEE CALCULATION**1. BASIC FILING FEE**

Large Entity Small Entity

Fee Fee Fee Fee Fee Description

Code (\$)	Code (\$)	Code (\$)	Code (\$)	Code (\$)	Fee Description
101 740	201 370				Utility filing fee
106 330	206 165				Design filing fee
107 510	207 255				Plant filing fee
108 740	208 370				Reissue filing fee
114 160	214 80				Provisional filing fee

Fee Paid

SUBTOTAL (1) (\$)

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Small Entity

Fee Fee Fee Fee Fee Description

Code (\$)	Code (\$)	Code (\$)	Code (\$)	Code (\$)	Fee Description
103 18	203 9				Claims in excess of 20
102 84	202 42				Independent claims in excess of 3
104 280	204 140				Multiple dependent claim, if not paid
109 84	209 42				** Reissue independent claims over original patent
110 18	210 9				** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2)

(\$)

**or number previously paid, if greater: For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
105	130	205	65			Surcharge - late filing fee or oath	
127	50	227	25			Surcharge - late provisional filing fee or cover sheet	
139	130	139	130			Non-English specification	
147	2,520	147	2,520			For filing a request for ex parte reexamination	
112	920*	112	920*			Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*			Requesting publication of SIR after Examiner action	110.00
115	110	215	55			Extension for reply within first month	
116	400	216	200			Extension for reply within second month	
117	920	217	460			Extension for reply within third month	
118	1,440	218	720			Extension for reply within fourth month	
128	1,960	228	980			Extension for reply within fifth month	
119	320	219	160			Notice of Appeal	
120	320	220	160			Filing a brief in support of an appeal	
121	280	221	140			Request for oral hearing	
138	1,510	138	1,510			Petition to institute a public use proceeding	
140	110	240	55			Petition to revive - unavoidable	
141	1,280	241	640			Petition to revive - unintentional	
142	1,280	242	640			Utility issue fee (or reissue)	
143	460	243	230			Design issue fee	
144	620	244	310			Plant issue fee	
122	130	122	130			Petitions to the Commissioner	
123	50	123	50			Processing fee under 37 CFR 1.17(q)	
126	180	126	180			Submission of Information Disclosure Stmt	
581	40	581	40			Recording each patent assignment per property (times number of properties)	
146	740	246	370			Filing a submission after final rejection (37 CFR § 1.129(a))	
149	740	249	370			For each additional invention to be examined (37 CFR § 1.129(b))	
179	740	279	370			Request for Continued Examination (RCE)	
169	900	169	900			Request for expedited examination of a design application	
Other fee (specify)							
SUBTOTAL (3)							(\$) 110.00

*Reduced by Basic Filing Fee Paid

SUBMITTED BY

Name (Print/Type)

Bruce B. Brunda

Registration No.
(Attorney/Agent)

28,497

Complete (if applicable)

Telephone

(949) 855-1246

Signature

Date

3/5/02

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Date Mailed: 03/05/02 Docket No.: NORTH-390A
Serial No.: 09/544,762
Filing Date: April 7, 2000
Title: RUGGED SHOCK RESISTANT BLACKPLANE FOR
EMBEDDED SYSTEMS

Papers transmitted herewith: Certificate of Mailing (1 page); Transmittal (1 page);
Fee Transmittal (1 page) (in duplicate); Petition for Extension of Time Under 37 CFR
1.136(a) (1 page); Amendment of 24 pages (including Marked-up Version); and
Return Postcard.

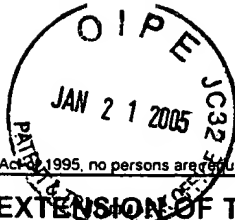
FROM:

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75 ENTERPRISE, SUITE 250
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TO:

Assistant Commissioner for Patents
Washington, D.C. 20231

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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional)
NORTH-390A / A-224

In re Application of: Shannon Mary Nelson

Application Number: 09/544,762

Filed: April 7, 2000

For: RUGGED SHOCK RESISTANT BLACKPLANE FOR EMBEDDED SYSTEMS

Group Art Unit: 2633

Examiner: Sedighian, R

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and appropriate non-small-entity fee are as follows (check time period desired):

- ☒ One month (37 CFR 1.17(a)(1)) \$ 110.00
- ☐ Two months (37 CFR 1.17(a)(2)) \$
- ☐ Three months (37 CFR 1.17(a)(3)) \$
- ☐ Four months (37 CFR 1.17(a)(4)) \$
- ☐ Five months (37 CFR 1.17(a)(5)) \$

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount shown above is reduced by one-half, and the resulting fee is: \$

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Commissioner has already been authorized to charge fees in this application to a Deposit Account.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 19-4330.

I have enclosed a duplicate copy of this sheet.

I am the

- ☐ applicant/inventor
- ☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).
- ☒ attorney or agent of record.
- ☐ attorney or agent under 37 CFR 1.34(a).
Registration number if acting under 37 CFR 1.34(a)

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Date

Signature

Bruce B. Brunda

Reg No. 28,497

Typed or printed name

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of forms are submitted.



Application No. 09/544,762

Case No.: NORTH-390A/A-2241

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Shannon Mary Nelson)
et al.)

Group No.: 2633

Serial No.: 09/544,762)

Examiner: Sedighian, R.

Filed: April 7, 2000)

For: RUGGED SHOCK RESISTANT)
BLACKPLANE FOR EMBEDDED SYSTEMS)

A M E N D M E N T

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON D C 20231

Dear Sir/Madam:

In response to the initial office action mailed November 27, 2001 in relation to the above-identified patent application, please amend the application as follows:

IN THE CLAIMS:

Please amend the following Claims:

1. (Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a first circuit card mounted to one of said circuit card connectors, said first circuit card having a first transmitter LED and a first receiver photodiode respectively formed thereon;

c) a second circuit card mounted to another of said circuit card connectors, said second circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon; and

d) wherein said first and second circuit cards are maintained in fixed relationship to one another via said common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired connectors such that said first receiver photodiode on said first circuit card is operative to receive signals produced from said second transmitter LED of said second circuit card, said second receiver photodiode being operative to receive signals from said first transmitter LED of said first circuit card.

2. (Amended) The system of Claim 1 wherein said signals generated by said first and second transmitter LEDs and received by said first and second receiver photodiodes comprise optically transmitted infrared radiation.

3. (Amended) The system of Claim 2 wherein said transmission and reception of signals between said first and second transmitter LEDs and said first and second receiver photodiodes comprise a standardized infrared communications scheme protocol.

5. (Amended) The system of Claim 1 wherein said first and second circuit cards are housed within an enclosure.

7. (Amended) The system of Claim 1 wherein said system comprises a multiplicity of circuit cards wherein each respective one of said multiplicity of circuit cards has a dedicated transmitter LED and receiver photodiode formed thereon, each respective one of said multiplicity of circuit cards being operative to transmit and receive data via said transmitter LED and said receiver photodiode formed thereon with the respective other circuit cards of said multiplicity of circuit cards.

8. (Amended) A method for operatively interconnecting circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation

thereon for supporting circuit cards in a generally parallel upright relationship;

b) providing a first circuit card having a first transmitter LED diode and a receiver photodiode respectively formed thereon;

c) providing a second circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon;

d) mounting said first circuit card to one of said circuit card connectors;

e) mounting said second circuit card to another of said circuit card connectors; and

f) spatially arranging said first circuit card relative to said second circuit card via the common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired connectors such that said first receiver photodiode on said first circuit card is operative to receive signals produced from said second transmitter LED of said second circuit card, said second receiver photodiode being operative to receive signals from said first transmitter LED of said first circuit card.

9. (Amended) The method of Claim 8 wherein step e), said

signals generated by said first and second transmitter LEDs and received by said first and second receiver photodiodes comprise optically transmitted infrared radiation.

10. (Amended) The method of Claim 8 wherein in step f), said transmission and reception of signals between said first and second transmitter LEDs and said first and second receiver photodiodes comprise a standardized infrared communications scheme protocol.

11. (Amended) The method of Claim 8 wherein in step f), said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. (Amended) The method of Claim 8 wherein step f), said first and second circuit cards are housed within an enclosure.

13. (Amended) The method of Claim 8 wherein in step f), said first and second circuit cards are operative to run an embedded application.

14. (Amended) The method of Claim 8 wherein step f), said system comprises a multiplicity of circuit cards wherein each respective one of said multiplicity of circuit cards has a dedicated transmitter LED and receiver photodiode formed thereon, each respective one of said multiplicity of circuit cards being operative to transmit and receive data via said transmitter LED and receiver photodiode formed thereon with the respective other circuit cards of said multiplicity of circuit cards.

Please add the following new Claims:

15. (New) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a first circuit card mounted to one of said circuit card connectors, said first circuit card having a first optical communications device formed thereon;

c) a second circuit card mounted to another of said circuit card connectors, said second circuit card having a second optical communications device formed thereon; and

d) wherein said first and second circuit cards are maintained in fixed relationship to one another via said common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired connectors.

REMARKS

Examiner's Rejections and Objections

The foregoing Amendment and remarks which follow are responsive to the initial Office Action mailed November 27, 2001. In that Office Action, the Examiner rejected Claim 13 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner further rejected Claims 1-3, 5-6, 8-10 and 12-13 under 35 U.S.C. § 103(a) as being unpatentable over Ishida (U.S. Pat. No. 5,949,565 "Ishida Reference") in view of Cern (U.S. Pat. No. 5,815,298 "Cern Reference"). Claims 4 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ishida Reference in view of the Cern Reference and in further view of Croft et al. (U.S. Pat. No. 5,864,708 "Croft Reference"). Claims 7 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ishida Reference in view of the Cern Reference and in further view of Kobayashi (U.S. Pat. No. 5,986,785 "Kobayashi Reference"), or Karstensen et al. (U.S. Pat. No. 5,923,451 "Karstensen Reference").

Applicants' Response

I. 35 U.S.C. § 112, Second Paragraph

The Examiner stated that there was insufficient antecedent

basis for the limitation "said first and second circuit cards" for Claim 13. Applicant has amended Claim 8 to provide such antecedent basis for first and second circuit cards. Applicant respectfully submits that such amendments to Claim 8 now contain proper antecedent basis and overcome the Examiner's stated grounds of rejection.

II. 35 U.S.C. § 103(a)

As to independent Claims 1 and 8, the Examiner stated that such claims were obvious under 34 U.S.C. § 103(a) over the Ishida reference in view of the Cern reference. Applicant respectfully submits that both the Ishida and Cern references are distinguishable from the present invention. Furthermore, combining the Ishida and Cern references would not produce the present invention. In this respect, Applicant respectfully submits that independent Claims 1 and 8, as amended, are novel in view of the cited references. A more detailed discussion explaining the distinguishable aspects of the alleged prior art is provided below.

A. *The Present Invention*

The present invention overcomes several deficiencies in the prior art by providing a shock-resistant system which initiates intercard optical communications between the circuit cards in a

computer system. Specifically, the computer system includes a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship. Advantageously, the common backplane used in conjunction with the LEDs and photodiodes of the first and second circuit cards allows circuit cards mounted in the circuit card connectors to effectuate optical intercard communications therebetween which are conducted independent of shock-susceptible wired connectors. Such communications may occur even though the first and second circuit cards operate at differing voltages. In addition, the use of such LEDs and photodiodes form a more reliable connection between the first and second circuit cards as opposed to hard-wiring. For example, in applications where computer systems must be transported frequently and otherwise withstand harsh environmental conditions, the wires may become dislodged from frequent impacts and shock exerted thereupon. Such disconnections require maintenance and diagnosis to determine the source of the problem. Further, the use of the common backplane creates a rigid environment for the circuit cards to be retained thereto and prevents the circuit cards from being dislodged therefrom. Thus, by providing an optical communications link between the first and second circuit cards and mounting the cards to a common backplane, the cards may then

withstand shock and continue to communicate in spite thereof. Additionally, mounting the first and second circuit cards in a generally upright parallel relationship facilitates the optical communications such that their respective LEDs and photodiodes may be placed into communication with each other.

A. *The Ishida Reference*

As understood, the Ishida reference discloses a portable electronic apparatus having a separate computer body and a separate display without any use of a common backplane. More specifically, the computer body has it's own computer housing and motherboard while the display has it's own housing and motherboard as well. Ishida further discloses the use of a light emission element disposed on the computer body which transmits optical signals to a light receive element disposed on the display via an inner hole of a boss. It is within this boss that the display and the computer body rotatably engage each other. Thus, the Ishida reference discloses a computer system having two separate and distinct components, the computer body and the display, each of the components having its own housing and motherboard such that optical signals may be communicated from one component to the other via a point of engagement.

As understood, the Ishida reference is designed to overcome a

problem inherent to laptop systems where traditional ribbon cables connecting the computer body with the display are worn out due to repetitive use sustained by frequent opening and closing of the display. Ishida replaces the ribbon cable with the optical transmitter and receiver, but such optical communications are intended to prevent disconnections between the separate computer body and the separate display.

Nothing suggests that the computer body (or its components) and the display housing (or its components) could share a common backplane. Moreover, even examining the computer body and the display housing individually, nothing suggests that such optical communications could be conducted within either the display or the housing or that there would be any advantage to doing so. The computer body utilizes a central motherboard structure. Within such a motherboard, circuitry for interconnecting various electronic components is embedded therewithin. Such a configuration is typically found in proprietary motherboards specifically designed to interconnect that particular configuration of components, and there is usually little room to interchange such components. As Ishida states, a "circuit board 7 is placed in substantially parallel with the bottom wall 5a of the housing 4." (Col. 4, lns. 5-6). Further, it is within this motherboard that "a hard disc drive 8 and a circuit elements 9 such a DRAM and a number

of other electronic components" are mounted thereon (Col. 4, lns. 6-8). Similarly, displays are also usually formed in the same manner. Thus, in the context of the Ishida reference, it is difficult to understand how or why one might utilize optical communications within Ishida's computer housing or display housing when such connections could be made more simply and effectively via circuitry embedded on the motherboard. By contrast, the present invention is specifically designed to allow for intercard communications via optical communications. It should also be noted that to integrate such optical communications in the Ishida system would require extensive programming and design, none of which is taught by Ishida.

In this respect, the Ishida reference fails to disclose a common backplane having a plurality of circuit card connectors. Nor does Ishida disclose first and second circuit boards mounted to the circuit card connectors such that intracard communications may be conducted between the circuit cards via the backplane. Instead, the Ishida reference merely teaches transmitting optical data between separate and distinct components which each have their own respective housings and fail to provide for any common backplane at all or any suggestions to integrate such a structure. To further demonstrate this point, Applicant directs the Examiner's attention to Figure 3. In Figure 3, the Ishida reference clearly illustrates

how the display (3) and the housing (2) are separate and distinct and that each contain their own circuitry therein.

A further advantage of the present invention in comparison to the prior art is the use of LEDs and photodiodes to create bidirectional communications links between the first and second circuit cards, thereby improving heat dissipation and air circulation within a computer system enclosure. In this respect, typical large scale computer systems and those utilizing embedded applications have several cables hardwired to each other such that much of the airspace inside the enclosure is littered with cables. One of the primary causes for computer system failure is overheating caused from lack of proper air circulation. Such a problem is even more apparent where the circuit cards are disposed in a generally upright parallel relation since much of the heat may be trapped therebetween and the use of cabling might further prevent such heat from dissipating therefrom. While computer systems may be equipped with intake and exhaust fans to induce air circulation, computer system enclosures having such cables suffer from inefficient air circulation because the air must navigate through the cables, thereby reducing the speed of air flowing throughout the enclosure. By wholly eliminating the use of cables in a computer system enclosure and adopting the use of LEDs and photodiodes on each circuit card for communications between circuit

cards, computer system enclosures may be cooled in a far more efficient manner due to the elimination of obstacles which formerly impeded proper air circulation. In this respect, reducing the amount of obstructions within the enclosure allows the circulating air to cool crucial microprocessors and circuits which heat up with extended use.

C. *The Cern Reference*

As understood, the Cern reference discloses the use of transceivers wherein bidirectional optical communications may be performed between two separate communications stations. However, Applicant respectfully submits that the Cern reference is distinguishable in that the communications stations are disclosed as being separate and distinct stations which do not share any common backplane. As described in the Cern reference, voice communications may be conducted between the stations such that a technician may speak into one station and transmit that signal to a second station where another technician is listening. (Cern, Col. 5, lns. 66-67 and Col. 6, lns. 1-19). In addition, Cern describes such second station as being a "remote station," which infers that while there may be a wireless connection between the two stations, there is no common backplane connecting the two. (Cern, Col. 7, lns. 1-7). In this respect, as Applicant understands, the Cern

reference merely discloses the use of two independent stations communicating with each other via a bidirectional optical communications link. Therefore, Applicant respectfully submits that while the Cern reference discloses transceivers capable of forming a bidirectional optical link therebetween, such link is taught only in the context of separate stations, each of which fail to share a common backplane.

Additionally, Ishida describes the use of optical communications to provide a link between the computer body and the display. Since displays are generally output-only devices, it is difficult to understand any benefit or desire for the Ishida reference to implement bidirectional communications since data is only fed to the display from the system. Nothing suggests that the Ishida system would benefit in being able to send signals to the computer body from the display. In that respect, Applicant submits that there is no motivation or suggestion to combine Cern's bidirectional communications systems with the Ishida system. By contrast, the present invention effectuates optical intercard communications while both the first and second circuit cards share a common backplane.

D. Combining the Ishida and Cern References Will Not Create the Present Invention.

Applicant respectfully submits that combining the Ishida and Cern references together will not create the present invention. Applicant believes the Ishida and Cern references are distinguishable from the present invention. However, even assuming arguendo, combining the Ishida and Cern references would create a wholly different invention in comparison to the present invention. At best, such a combination might create an electronic apparatus having two separate and distinct components (the computer body and the display), each of the components having their own respective housings and motherboards. Furthermore, even if the transceivers disclosed by Cern were to be combined with the electronic apparatus in Ishida, nothing in the Cern reference teaches or suggests that such transceivers could operate within Ishida's electronic apparatus since Cern describes the transceivers as being placed within stations which operate independently from each other. Additionally, there is no common backplane described anywhere in the Cern reference and there is no teaching or suggestion that such transceivers are or can be mounted to a common backplane. In this respect, the common backplane of the present invention provides for shock-resistant properties and neither Cern nor Ishida disclose any desirability for such a backplane, especially in lieu of the separate and independent nature of the components disclosed therein.

III. New Independent Claim 15

Applicant has amended new independent Claim 15 which contains the substance of amended independent Claim 1 yet emphasizes the novelty of the optical communications device on the first and second circuit cards. More specifically, Independent Claim 15 emphasizes that the optical communications provided in the present invention are not limited to the use of LEDs and photodiodes. As one of ordinary skill will recognize, other types of optical devices, such as LEDs and photodiodes, may be used within the scope of the invention in combination with one directional or bidirectional circuits, all of which is intended to be encompassed within the scope of the claimed invention.

IV. Request for Allowance

Applicant submits that dependant Claims 2-4 and 6-7 further define novel details of the invention as cited in independent Claim 1 while dependent Claims 9-11 and 13-14 further define novel details of the invention as cited in independent Claim 8. Lastly, Applicant submits that new independent Claim 15 is novel in view of the prior art. On the basis of the foregoing, Applicant submits that the stated grounds of rejection have been overcome, and that such claims are in now condition for allowance. An early Notice of Allowance is therefore respectfully submitted.

Application No. 09/544,762

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

Should the Examiner have any suggestions for expediting allowance of the application, the Examiner is invited to contact Applicant's representative at the telephone number listed below. If a fee is required, please charge Account Number 14-1325.

Respectfully submitted,

Date: Mar 5, 2000

By:

Bruce B. Brunda

Bruce B. Brunda
Registration No. 28,947
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(949) 855-1246

BBB:STB/cb

T:\Client Documents\NORTH\390a\NORTH-390A Amendment (v2).wpd

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the following Claims:

1. (Amended) A shock-resistant system for operatively interconnecting circuit cards [modules] within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) [a.] a first [module] circuit card mounted to one of said circuit card connectors, said first circuit card having a first transmitter LED and a first receiver photodiode respectively formed thereon;

c) [b.] a second [module] circuit card mounted to another of said circuit card connectors, said second circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon; and

d) [c.] wherein said first and second [modules] circuit cards are maintained in fixed relationship to one another via said common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired

connectors such that said first receiver photodiode on said first [module] circuit card is operative to receive [a signal] signals produced from said second transmitter LED of said second [module] circuit card, [and] said second receiver photodiode [is] being operative to receive signals from said first transmitter LED of said first [module.] circuit card.

2. (Amended) The system of Claim 1 wherein said signals generated by said first and second transmitter LEDs and received by said first and second receiver photodiodes [comprised] comprise optically transmitted infrared radiation.

3. (Amended) The system of Claim 2 wherein said transmission and reception of signals between said first and second transmitter [LED's] LEDs and said first and second receiver photodiodes comprise a standardized infrared communications scheme protocol.

5. (Amended) The system of Claim 1 wherein said first and second circuit cards [modules] are housed within an enclosure.

7. (Amended) The system of Claim 1 wherein said system comprises a multiplicity of [modules] circuit cards wherein each respective one of said multiplicity of [modules] circuit cards has a dedicated transmitter LED and receiver photodiode formed thereon, each respective one of said multiplicity of [modules] circuit cards being operative to transmit and receive data via said transmitter LED and said receiver photodiode formed thereon with the respective

other [modules] circuit cards of said multiplicity of circuit cards. [modules.]

8. (Amended) A method for operatively interconnecting [modules] circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally parallal upright relationship;

b) [a.] providing a first [module] circuit card having [at least one] a first transmitter LED diode and a receiver photodiode respectively formed thereon;

c) [b.] providing a second [module] circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon;

d) mounting said first circuit card to one of said circuit card connectors;

e) mounting said second circuit card to another of said circuit card connectors; and

f) [c.] spatially arranging said first circuit card [module] relative to said second circuit card [module] via said common backplane to effectuate optical intercard communications therebetween, said intercard communications

being conducted independent of shock-susceptible wired connectors such that said first receiver photodiode on said first [module] circuit card is operative to receive [a signal] signals produced from said second transmitter LED of said second [module] circuit card, [and] said second receiver photodiode [is] being operative to receive signals from said first transmitter LED of said first [module] circuit card.

9. (Amended) The method of Claim 8 wherein step [c)] f), said signals generated by said first and second transmitter LEDs and received by said first and second receiver photodiodes comprise optically transmitted infrared radiation.

10. (Amended) The method of Claim 8 wherein in step [c)] f), said transmission and reception of signals between said first and second transmitter LEDs and said first and second receiver photodiodes comprise a standardized infrared communications scheme protocol.

11. (Amended) The method of Claim 8 wherein in step [c)] f), said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. (Amended) The method of Claim 8 wherein step [c)] f), said first and second circuit cards [modules] are housed within an enclosure.

13. (Amended) The method of Claim 8 wherein in step [c)] f),

said first and second circuit cards are operative to run an embedded application.

14. (Amended) The method of Claim 8 wherein step [c)] f), said system comprises a multiplicity of circuit cards [modules] wherein each respective one of said multiplicity of circuit cards [modules] has a dedicated transmitter LED and receiver photodiode formed thereon, each respective one of said multiplicity of circuit cards [modules] being operative to transmit and receive data via said transmitter LED and receiver photodiode formed thereon with the respective other circuit cards [modules] of said multiplicity of circuit cards. [modules].

Please add the following new Claims:

15. (New) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a first circuit card mounted to one of said circuit card connectors, said first circuit card having a first optical communications device formed thereon;

c) a second circuit card mounted to another of said

circuit card connectors, said second circuit card having a second optical communications device formed thereon; and

d) wherein said first and second circuit cards are maintained in fixed relationship to one another via said common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired connectors.

BBB:STB

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D-99015



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590

07/25/2002

Terry J Anderson Esq
 Northrop Grumman Corporation
 1840 Century Park East
 Los Angeles, CA 90067



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JUL 31 2002

PATENT DEPARTMENT DATE MAILED: 07/25/2002

EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/544,762	NELSON ET AL.	
	Examiner	Art Unit	
	M. R. Sedighian	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

1. This communication is responsive to applicant's 5/6/2002 amendments in the application of Shannon Mary Nelson et al. for "Rugged shock resistant backplane for embedded systems" filed 4/7/2000. The amendments have been entered. Claims 1-15 are now pending.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 6-10, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bishop (US Patent No: 6,038,355) in view of Ozeki et al. (US Patent No: 6,317,242).

Regarding claims 1, 8, and 15, Bishop discloses a shock-resistant system (fig. 1) for interconnecting circuit cards (14, 16, 18, fig. 1) within a computer system (col. 2, lines 63-67, col. 3, lines 1-10, col. 6, lines 19-20) to enable data to be transmitted and received therebetween (col. 6, lines 21-22), comprising: a common backplane (12, fig. 1) having a plurality of circuit card connectors (20, fig. 1) disposed in spaced apart relation (col. 3, lines 25-30) for supporting circuit cards (col. 3, lines 34-39) in upright parallel relationship (col. 3, line 29); a first circuit card (14, fig. 1) mounted to one of the circuit card connectors (20, fig. 1) and having an optical interface (30, fig. 1) that is comprised of a transmitter (34, fig. 2) and a receiver (58, fig. 2); a second circuit card (16, fig. 1) mounted to another one of connectors (20, fig. 1) and having a second optical interface (30, fig. 1) with a transmitter (34, fig. 2) and a receiver (58, fig. 2); wherein the first and second circuit cards are maintained in fixed relationship to one another via the common backplane to effectuate optical intercard communications therebetween (col. 3, lines

Art Unit: 2633

40-41), and the intercard communications being conducted independent of shock-susceptible wired connectors (col. 3, lines 44-66). Bishop differs from the claimed invention in that Bishop does not disclose the first receiver photodiode on the first circuit card is operative to receive signals produced from the second transmitter LED of the second circuit card, and second receiver photodiode being operative to receive signals from the first transmitter LED of the first circuit card. Ozeki discloses a plurality of circuit cards (40, fig. 1) each having light emitting/receiving circuits (42, 42a, 42b, fig. 1), and wherein the first receiver photodiode (42b, A, fig. 1) on the first circuit card (40, A, fig. 1) is operative to receive signals produced from the second transmitter LED (42a, D, fig. 1) of the second circuit card (40, D, fig. 1), and a second receiver photodiode (42b, D, fig. 1) being operative to receive signals from the first transmitter LED (42a, A, fig. 1) of the first circuit card (40, A, fig. 1). Therefore, it would have been obvious to an artisan at the time of invention to incorporate optical transceiver modules such as the one of Ozeki for the optical transmission/reception interfaces of Bishop in order to provide a bi-directional optical data transmission and reception between a plurality of components within a computer system.

Regarding claims 2 and 9, Ozeki discloses optically transmitted infrared radiation (col. 1, lines 5-11).

Regarding claims 3 and 10, Bishop further discloses the transmission and reception signals comprise a standardized infrared communication scheme protocol (col. 6, lines 22-25).

Regarding claims 6 and 13, Bishop discloses the first and second circuit cards are operative to run an embedded application (col. 6, lines 19-25).

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Regarding claims 7 and 14, Ozeki disclose the system comprises a multiplicity of circuit cards (col. 5, line 55 and 40, A, B, D, E, fig. 1) each having an LED (42a, fig. 1) and a photodiode (42b, fig. 1) formed thereon and the circuit cards are being operative to transmit and receive data via LEDs and photodiodes with respective other circuit cards (col. 5, lines 65-67, col. 6, lines 1-24, col. 7, lines 3-11).

4. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bishop (US Patent No: 6,038,355) in view of Ozeki et al. (US Patent No: 6,317,242) in further view of Croft et al. (US Patent No: 5,864,708).

Regarding claims 4 and 11, the combination of Bishop and Ozeki further differs from the claimed invention in that Bishop and Ozeki do not specifically disclose the infrared communication protocol is developed by the infrared data association. Croft discloses wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Infrared Data Association standards or protocols such as the one discussed by Croft for the infrared data transmission and reception in the modified optical communication systems of Bishop and Ozeki in order to provide a reliable method of data transmission by implementing a standard Infrared protocol to detect transmission errors and to avoid collisions.

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5. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bishop (US Patent No: 6,038,355) in view of Ozeki et al. (US Patent No: 6,317,242) in further view of Barina (US Patent No: 4,829,596).

Regarding claims 5 and 12, the combination of Bishop and Ozeki further differs from the claimed invention in that Bishop and Ozeki do not disclose the first and second circuit cards are housed within an enclosure. Barina discloses a housing (12, fig. 1) which includes a series of slots that receive a plurality of circuit boards (16-18, fig. 1) that are connected to a mother board which extends along the back surface of the housing to a backplane (col. 2, lines 55-61 and 11, fig. 1). It is inherent that electrical or optical components are housed within a housing for the reason of safety and protection, and it would have been obvious to provide an enclosure such as the one Barina for the circuit cards in the modified optical communication system of Bishop and Ozeki in order to protect its components and to provide safety for the users.

6. Applicant's arguments with respect to claims 1-3, 5, and 7-14 have been considered but are moot in view of the new ground(s) of rejection.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after


Art Unit: 2633

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad R Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.


JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Notice of References Cited	Application/Control No. 09/544,762	Applicant(s)/Patent Under Reexamination NELSON ET AL.	
	Examiner M. R. Sedighian	Art Unit 2633	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
	A	US-4,829,596	05-1989	Barina	455	612
	B	US-6,317,242	11-2001	Ozeki et al.	359	163
	C	US-6,038,355	03-2000	Bishop	385	14
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification	
	N						
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	Q						
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	S						
	T						

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



ATTORNEY DOCKET:
NORTH-390A
Serial No. 09/554,762
Filed: April 7, 2000

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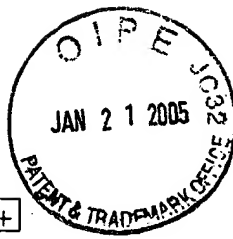
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Date Mailed: October 18, 2002 Docket No.: NORTH-390A
Serial No.: 09/554,762
Filing Date: April 7, 2000
Title: RUGGED SHOCK RESISTANT BACKPLANE FOR EMBEDDED SYSTEMS

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/544,762
	Filing Date	April 7, 2000
	First Named Inventor	Shannon Mary Nelson
	Group Art Unit	2633
	Examiner Name	Sedighian, R.
Total Number of Pages in This Submission	Attorney Docket Number	NORTH-390A

ENCLOSURES (check all that apply)		
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
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Signature	<i>Bruce B. Brunda</i>
Date	Oct 18, 2000

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Application No. 09/544,762

Case No.: NORTH-390A/A-2241

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Shannon Mary Nelson)
et al.)

Group No.: 2633

Serial No.: 09/544,762)

Examiner: Sedighian, R.

Filed: April 7, 2000)

For: RUGGED SHOCK RESISTANT)
BACKPLANE FOR EMBEDDED SYSTEMS)

AMENDMENT AFTER FINAL OFFICE ACTION

ASSISTANT COMMISSIONER FOR PATENTS
BOX AF
WASHINGTON D C 20231

Dear Sir/Madam:

In response to the final office action mailed, July 25, 2002 in relation to the above-identified patent application, please amend the application as follows:

IN THE CLAIMS:

Please amend the following Claims:

1. (Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel

relationship;

b) a plurality of circuit cards, each of said circuit cards being mounted to one of said circuit card connectors, each of said circuit cards having a transmitter LED and a receiver photodiode formed thereon;

c) an optical pathway formed between each of said circuit cards, each optical pathway forming a respective independent parallel optical connection between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards; and

d) wherein said circuit cards are maintained in fixed relationship to one another via said common backplane to maintain continuous optical intercard communications between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors.

8. (Amended) A method for operatively interconnecting circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally parallel

upright relationship;

b) providing a plurality of circuit cards having a transmitter LED diode and a receiver photodiode formed thereon;

c) mounting each of said circuit cards to one of said circuit card connectors;

d) forming an optical pathway between each of said circuit cards;

e) forming independent parallel optical connections between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards; and

f) spatially arranging each of said circuit cards relative to one another via said common backplane to maintain continuous optical intercard communications between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors.

15. (Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for

supporting circuit cards in a generally upright parallel relationship;

b) a plurality of circuit cards, each of said circuit cards being mounted to one of said circuit card connectors, each of said circuit cards having an optical communications device formed thereon;

c) an optical pathway formed between each of said circuit cards, each optical pathway forming a respective independent parallel optical connection between said optical communications devices; and

d) wherein each of said circuit cards are maintained in fixed relationship to one another via said common backplane to maintain continuous optical intercard communications between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors.

REMARKS

Examiner's Rejections and Objections

The foregoing Amendment and remarks which follow are responsive to the final Office Action mailed July 25, 2002. In that Office Action, the Examiner rejected Claims 1-3, 6-10, and 13-15 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 6,038,355 issued to Bishop ("Bishop") in view of U.S. Pat. No. 6,317,242 issued to Ozeki et al. ("Ozeki"). The Examiner further rejected Claims 4 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Bishop in view of Ozeki in further view of U.S. Pat. No. 5,864,708 issued to Croft et al. ("Croft"). Finally, the Examiner rejected Claims 5 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Bishop in view of Ozeki in further view of U.S. Pat. No. 4,829,596 issued to Barina ("Barina").

Applicants' Response

I. 35 U.S.C. § 103(a) - Claims 1-3, 6-10, and 13-15

In Applicant's view, neither the Bishop reference nor the Ozeki reference disclose an optical pathway forming independent parallel optical connection between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards as claimed in the present invention. Further, Applicant believes that neither the Bishop nor Ozeki references

disclose a plurality of circuit cards maintained in fixed relationship to another via a common backplane to maintain continuous optical intercard communications between each of the circuit cards when the circuit cards become intermittently dislodged from electrical connection to the backplane as claimed in the present invention.

As to independent Claims 1, 8, and 15, the Examiner stated that such claims were obvious under 35 U.S.C. § 103(a) over the Bishop reference in view of the Ozeki reference. Applicant respectfully submits that both the Bishop and Ozeki references are distinguishable from the present invention. Furthermore, in Applicant's view, combining the Bishop and Ozeki references would not produce the present invention. In this respect, Applicant respectfully submits that independent Claims 1, 8 and 15, as amended, are novel in view of the cited references. A more detailed discussion explaining the distinguishable aspects of the alleged prior art is provided below.

A. *The Present Invention*

The present invention overcomes several deficiencies in the prior art by providing a shock-resistant system which initiates intercard optical communications between the circuit cards in a computer system. Advantageously, the shock-resistant system forms

an optical pathway between each of the circuit cards. Each optical pathway forms a respective independent parallel optical connection between the transmitter LED on one of the circuit cards and the receiver photodiode on any one of the circuit cards. By providing such independent parallel optical connections, each of the circuit cards are capable of communicating with one another without introducing the problems generally associated with optical systems having shared paths. The independent parallel optical connections allow for simplified programming since each packet of data transmitted across the independent parallel optical connection already assumes its target destination. In this respect, such independent optical connections substantially reduce or eliminate the need to integrate programming steps which sort through and route data to the proper destination.

By providing such independent parallel optical connections between each of the circuit cards, the requirement for additional encoding/decoding electronics is reduced, incidence of cross-talk between signals is reduced, and ability to maintain a parallel connection is maintained when external shock is exerted upon the system. In this respect, the optical communications are generally maintained in parallel such that should any one circuit card become dislodged from data connectors on the backplane, optical communication between other circuit cards would remain functional.

Additionally, the present invention maintains continuous optical intercard communications between each of the circuit cards when the circuit cards become intermittently dislodged from electrical connection to the backplane. An objective of the present invention is to withstand extreme external environmental conditions which generally cause interruptions in communication between circuit cards mounted within a shock-resistant enclosure. While intercard communications may be accomplished by using transmitter LEDs and receiver photodiodes on the circuit cards, the circuit cards of the present invention are mounted to the common backplane to allow for wireless communication between the circuit cards. Preferably, the circuit cards are rigidly mounted to the common backplane so as to minimize dislodgement of the circuit cards from circuit card connectors disposed on the common backplane. As is generally apparent in most contemporary computer systems, under extreme environmental conditions, high impact force or shock may intermittently dislodge the circuit cards from electric connection to the backplane. Should such dislodgement of circuit cards formed according to the present invention occur, so long as electrical contacts between the circuit cards and their respective circuit card connectors are substantially maintained, intercard communications are advantageously preserved. Such configuration allows the circuit cards to maintain continuous optical intercard

communications despite such intermittent dislodgement. For example, the system formed according to the present invention may be utilized as a redundant communication system which may maintain continuous intercard communications despite intermittent dislodgment. As will be discussed in further detail, none of the cited references disclose such independent parallel optical connections or exhibit such advantages.

B. The Bishop Reference

In the Final Office Action, the Examiner stated that it would have been obvious to combine the optical transmission/reception interfaces disclosed in Bishop with the optical transceiver modules disclosed in Ozeki to provide bi-directional optical data transmission and reception between a plurality of components within a computer system. As understood by Applicant, the Bishop reference fails to disclose independent parallel optical connections formed along optical pathways and further fails to disclose maintaining continuous optical intercard communications. Instead, it appears that dislodgment of the daughter cards disclosed in Bishop would impede communications between the daughter cards. As will be discussed in further detail below, Bishop discloses a substantially serial system which passes optical signals along a shared path between each of the daughter cards.

The circuit cards of the present invention do not pass optical signals on to other circuit cards via any shared paths. Instead, each of the circuit cards of the present invention form their own independent parallel optical connections between the transmitter LED and the receiver photodiode on any one of the circuit cards, free of any shared paths. By forming such independent parallel optical connections, external shock exerted upon the backplane, slight misalignments, and intervening modules will not substantially effect the intercard communications.

As understood by Applicant, Bishop conducts serial optical communications by relying upon a series of mirrors and beam splitters on each of the daughter cards to allow for optical communications therebetween. These mirrors and beam splitters appear to reproduce and split optical signal such that Bishop discloses shared optical paths formed between each of the daughter cards. More particularly, as understood by Applicant, relatively precise alignment of the daughter modules is required in order to allow both a left-going optical bus path 62 and a right-going optical bus path 64 to pass through each of the daughter modules. Bishop, col. 4, lns. 24-34. In this respect, it appears that communication between the daughter modules may be interrupted or made impossible if one of the adjacent daughter modules is not precisely aligned to allow optical paths 62 and 64 shared between

all of the daughter cards to pass therethrough.

For example, as shown in FIG. 1 of Bishop, proper flow of optical light along the shared paths 62 and 64 relies upon the alignment of the daughter modules in an upright position. As stated in Bishop itself, "all participating boards must be adjacent with no intervening non-optical boards." Bishop, col. 4, lns. 61-62. Optical transmissions are generally conducted through air and physical obstacles blocking the path of transmission would generally impede or prevent optical transmissions. In fact, Bishop describes the shared paths 62 and 64 as passing through two holes 31 and 33 which are "accurately positioned near and relative to the system bus connector." Bishop, col. 4, lns. 58-61. These holes are described as being extremely small, or about "1/8-1/4 in each." Bishop, col. 4, ln. 58. Such extremely small holes would appear to require a high degree of precision in aligning the cards. Thus, according to the limitation described by Bishop, it appears that an intervening board would essentially impede communication by blocking the shared paths 62 and 64. Bishop states that "[w]hile there can be a significant loss of signal when boards are separated by intervening boards, or because of misalignment, these losses are comparable to those found in relatively short runs of optical fibers." Bishop, col. 5, lns. 4-7. Thus, it appears that even slight dislodgement or misalignment of the daughter cards might

interrupt communication between some, if not all, of the daughter cards.

By contrast, the present invention overcomes such deficiencies by forming an optical pathway between each of the circuit cards which forms independent parallel optical connections between each of the circuit cards. These connections are each independent in nature and do not require the circuit cards to be precisely aligned or that there be any shared paths. For example, where first, second and third circuit cards are provided, an independent parallel optical connection may be formed between the first and second circuit cards, between the second and third cards, and between the first and third cards. In this respect, none of the connections rely upon alignment of the cards and the optical connections between the circuit cards are independent of each other instead of shared as in Bishop.

Advantageously, forming such independent parallel optical connections substantially reduces the need for additional electronics which may otherwise be required to route data along the optical connections. Because Bishop appears to form shared paths, each of the daughter cards may be required to encode and decode data transferred along the shared paths for routing data to the proper recipient daughter card. However, because the present invention forms independent parallel optical connections between

each of the circuit cards, the connections are each assigned circuit card pairs. In this respect, such connections may not need additional instructions and programming to indicate where the data should be traveling since such connections are already preassigned.

Additionally, while Bishop does state that "[l]ight need not necessarily pass through holes, however, but can instead pass along one side of the boards if a clear path is available," it appears that nothing more is disclosed which would enable one skilled in the art to construct or even understand how the optical interfaces could be positioned on the daughter modules. Bishop col. 4, lns. 65-67. Nevertheless, even if the optical interfaces were disposed on a "side of the boards," the complex configuration of mirrors and beam splitters appears to suggest that communication between the daughter boards would still rely upon precise alignment of the boards and would still be serial in nature. In Applicant's view there is no suggestion that the connections would become independent or parallel since the paths would still be shared between all the daughter cards. Further, it appears that even if the paths were to pass along a side of the daughter boards, the application of an external shock upon the Bishop system would force the daughter modules into misalignment and disable optical communications therebetween.

Therefore, Applicant respectfully submits that the Bishop reference is distinguishable from the present invention and fails to disclose independent parallel optical connections formed between the transmitter LED on one of the circuit cards and the receiver photodiode on any one of the circuit cards.

C. The Ozeki Reference

The Examiner cited the Ozeki reference as having light emitting/receiving circuits. However, Applicant respectfully submits that Ozeki fails to disclose independent parallel optical connections formed between the transmitter LED on one of the circuit cards and the receiver photodiode on any one of the circuit cards. In Applicant's view, no independent parallel optical connections are disclosed in Ozeki because Ozeki relies upon a network of designated input nodes, output nodes, and repeaters which relay data.

As understood by Applicant, Ozeki is distinguishable from the present invention in that it merely discloses a communication system which relies upon complex additional circuitry to "repeat" incoming optical data and send this optical data off to other circuits. As described in Ozeki, a series of nodes are provided which relay data using receiving/emitting circuitry. More specifically, FIG. 1 illustrates that nodes A and C are dedicated

"light input nodes through which an externally entered electrical signal is converted to light and input to the optical bus 20," nodes B, D, and F "act as light output nodes through which signal light propagated in the optical bus 20 is received and converted back to an electrical signal for output from the bus 20" while node E "operates as a repeat node that received propagated light and sends out the received light for retransmission." Ozeki, col. 6, lns. 13-21. Additionally, "each light receiving/emitting circuit 42 has the repeater 42c that receives light from the opposite edge of the bus 20 and sends the received light back toward the opposite edge." Ozeki, col. 6, lns. 28-31. Thus, it appears that failure of the repeater, which essentially acts as a hub, might be detrimental by interrupting communication between the dedicated input and output nodes. Use of the repeaters suggests that there is a network of shared paths. Instead of forming independent parallel optical connections as in the present invention, each of the nodes appear to share paths by receiving and processing incoming data while retransmitting such data to other nodes.

While the Examiner states that Ozeki discloses optical transmission/reception interfaces, Applicant submits that such elements cannot be taken out of context. As previously described, the receiving/emitting circuit appears to require the use of a repeater to process incoming data and reproduce this data for

retransmission. As Applicant understands, there is no suggestion in Ozeki that the receiving/emitting circuit could be simply integrated with other devices without the presence of the repeater. Ozeki suggests that the repeater is integrated to overcome difficulties discovered. In particular, Ozeki states that "it is difficult to transmit signal light from an input node directly to an output node on the same edge. . . each light receiving/emitting circuit 42 has the repeater 42c that receives signal light from the opposite edge of the bus 20 and sends the received light back toward the opposite edge."

In the present invention, there is no such repeater since no signals are being retransmitted. Each of the circuit cards in the present invention has its own independent parallel optical connection formed with another circuit card. Since these connections are independent, there is no need to retransmit the optical signals to other cards. In fact, retransmitting the signals to other cards would likely be disadvantageous to the independent parallel optical connections since circuit cards may confuse retransmitted data with data transferred along the optical pathway.

Therefore, Applicant respectfully submits that the Ozeki reference is distinguishable from the present invention and also fails to disclose independent parallel optical connections formed

between circuit cards.

D. *Combining the Bishop and Ozeki References Will Not Create the Present Invention.*

Applicant respectfully submits that combining the Bishop and Ozeki references together will not create the present invention. Applicant believes the Bishop and Ozeki references are distinguishable from the present invention. However, even assuming arguendo, combining the Bishop and Ozeki references would create a wholly different invention in comparison to the present invention. The present invention forms independent parallel optical connections between each of the circuit cards and further maintains continuous optical intercard communications between each of the circuit cards when the circuit cards become intermittently dislodged from electrical connection to the backplane. However, at best, it appears that a combination of the Bishop and Ozeki references might create a computer system having daughter modules which communicate serially and rely upon precise alignment of optical circuitry and repeaters for allowing the daughter modules to communicate with each other. Even further, in Applicant's view, there is nothing to indicate in the Bishop reference that the nodes and associated circuitry of Ozeki could operate with the daughter modules of Bishop. In fact, Ozeki's use of repeaters and dedicated

input and output nodes appears to suggest that the two systems are incompatible since Bishop utilizes a pass-through type optical circuitry which relies upon beam splitters and mirrors instead of repeaters.

IV. Request for Allowance

Applicant submits that Claims 2-7 further define novel details of the invention as cited in independent Claims 1 while Claims 9-14 further define novel details of the invention as cited in independent Claim 8. On the basis of the foregoing, Applicant submits that the stated grounds of rejection have been overcome, and that such claims are in now condition for allowance. An early Notice of Allowance is therefore respectfully submitted.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

Application No. 09/544,762

Should the Examiner have any suggestions for expediting allowance of the application, the Examiner is invited to contact Applicant's representative at the telephone number listed below. If a fee is required, please charge Account Number 14-1325.

Respectfully submitted,

Date: Oct 18, 2009

By: Bruce B. Brunda

Bruce B. Brunda
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STETINA BRUNDA GARRED & BRUCKER
75 Enterprise, Suite 250
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BBB:STB

T:\Client Documents\NORTH\390a\NORTH-390A final Amendment(v2).wpd

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the following Claims:

1. (Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a plurality of circuit cards, each of said circuit cards being mounted to one of said circuit card connectors, each of said circuit cards having a transmitter LED and a receiver photodiode formed thereon; ~~a first circuit card mounted to one of said circuit card connectors, said first circuit card having a first transmitter LED and a first receiver photodiode respectively formed thereon,~~

~~c) a second circuit card mounted to another of said circuit card connectors, said second circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon, and~~

c) an optical pathway formed between each of said circuit cards, each optical pathway forming a respective

independent parallel optical connection between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards; and

d) wherein said ~~first and second~~ circuit cards are maintained in fixed relationship to one another via said common backplane to ~~effectuate~~ maintain continuous optical intercard communications ~~therebetween~~ between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors. ~~such that said first receiver photodiode on said first circuit cards is operative to receive signals produced from said second transmitter LED of said second circuit card, said second receiver photodiode being operative to receive signals from said first transmitter LED of said first circuit card.~~

8. (Amended) A method for operatively interconnecting circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally parallel upright relationship;

b) providing a plurality of first circuit cards each having a ~~first~~ transmitter LED diode and a receiver photodiode respectively formed thereon;

~~c) providing a second circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon;~~

~~c) d)~~ mounting each of first said circuit cards to a respective one of said circuit card connectors;

~~e) mounting said second circuit card to another of said circuit card connectors, and~~

d) forming an optical pathway between each of said circuit cards;

e) forming independent parallel optical connections between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards; and

f) spatially arranging each of said ~~first~~ circuit cards relative to one another ~~said second circuit card~~ via said common backplane to ~~effectuate~~ maintain continuous optical intercard communications ~~therebetween~~ between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors. ~~such that said first receiver~~

~~photodiode on said first circuit card is operative to receive signals produced from said second transmitter LED of said second circuit card, said second receiver photodiode being operative to receive signals from said first transmitter LED of said first circuit card.~~

15. (Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a plurality of first circuit cards, each of said circuit cards being mounted to one of said circuit card connectors, ~~said first~~ each of said circuit cards having an first optical communications device formed thereon;

~~c) a second circuit card mounted to another of said circuit card connectors, said second circuit card having a second optical communications device formed thereon, and~~

c) an optical pathway formed between each of said circuit cards, each optical pathway forming a respective independent parallel optical connection between said optical communications devices; and

d) wherein ~~said first and second~~ each of said circuit cards are maintained in fixed relationship to one another via said common backplane to ~~effectuate~~ maintain continuous optical intercard communications ~~therebetween~~ between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors.

BBB:STB

T:\Client Documents\NORTH\390a\NORTH-390A final Amendment (Marked)(v2).wpd

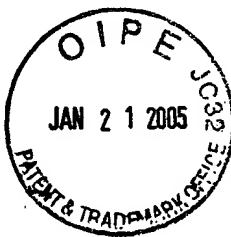


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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590 11/19/2002
Terry J Anderson Esq
Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 92677-2199



EXAMINER

SEDIGHIAN, REZA

ART UNIT PAPER NUMBER

2633

DATE MAILED: 11/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 25 October 2002 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
- b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.
2. ☒ The proposed amendment(s) will not be entered because:
- (a) ☒ they raise new issues that would require further consideration and/or search (see NOTE below);
 - (b) ☐ they raise the issue of new matter (see Note below);
 - (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
 - (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: See Continuation sheet.

3. ☐ Applicant's reply has overcome the following rejection(s): _____.
4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
5. ☐ The a) ☐ affidavit, b) ☐ exhibit, or c) ☐ request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.
7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☒ will not be entered or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____.

Claim(s) objected to: _____.

Claim(s) rejected: 1-15.

Claim(s) withdrawn from consideration: _____.

8. ☐ The proposed drawing correction filed on _____ is a) ☐ approved or b) ☐ disapproved by the Examiner.
9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____.
10. ☐ Other: _____.

A plurality of circuit cards that are mounted to a plurality of circuit card connectors, and an optical pathway that are formed between each of the circuit cards to provide a parallel connection, and the circuit cards that are become intermittently dislodged from electrical connection to backplanes, of claims 1, 8, and 15, require further consideration and/or search.


JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600



ATTORNEY DOCKET:
NORTH-390A
Serial No. 09/554,762
Filed: April 7, 2000

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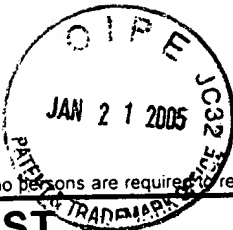
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**REQUEST
FOR
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Application Number	09/544,762
Filing Date	4/07/2000
First Named Inventor	Shannon Mary Nelson
Art Unit	2633
Examiner Name	Reza Sedighian
Attorney Docket Number	NORTH-390A

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114

- a. ☒ Previously submitted
- i. ☒ Consider the amendment(s)/reply under 37 CFR 1.116 previously filed on October 18, 2002
(Any unentered amendment(s) referred to above will be entered).
- ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- iii. ☐ Other _____
- b. ☐ Enclosed
- i. ☐ Amendment/Reply
- ii. ☐ Affidavit(s)/Declaration(s)
- iii. ☐ Information Disclosure Statement (IDS)
- iv. ☐ Other _____

2. Miscellaneous

- a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)
- b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

- a. ☒ The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 19-4330
- i. ☐ RCE fee required under 37 CFR 1.17(e)
- ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)
- iii. ☒ Other Additional Fees
- b. ☒ Check in the amount of \$ 750.00 enclosed
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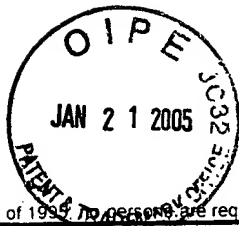
Name (Print/Type)	Bruce B. Brunda	Registration No. (Attorney/Agent)	28,497
Signature	<i>Bruce B. Brunda</i>	Date	1/9/03

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FEE TRANSMITTAL for FY 2003

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 750.00

Complete if Known

Application Number	09/544,762
Filing Date	4/07/2000
First Named Inventor	Shannon Mary Nelson
Examiner Name	Reza Sedighian
Art Unit	2633
Attorney Docket No.	NORTH-390A

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 740	2001 370	Utility filing fee	
1002 330	2002 165	Design filing fee	
1003 510	2003 255	Plant filing fee	
1004 740	2004 370	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1) (\$)			

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 84	2201 42	Independent claims in excess of 3
1203 280	2203 140	Multiple dependent claim, if not paid
1204 84	2204 42	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

**or number previously paid, if greater. For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 400	2252 200	Extension for reply within second month	
1253 920	2253 460	Extension for reply within third month	
1254 1,440	2254 720	Extension for reply within fourth month	
1255 1,960	2255 980	Extension for reply within fifth month	
1401 320	2401 160	Notice of Appeal	
1402 320	2402 160	Filing brief in support of an appeal	
1403 280	2403 140	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,280	2453 640	Petition to revive - unintentional	
1501 1,280	2501 640	Utility issue fee (or reissue)	
1502 460	2502 230	Design issue fee	
1503 620	2503 310	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 740	2809 370	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 740	2810 370	For each additional invention to be examined (37 CFR 1.129(b))	
1801 740	2801 370	Request for Continued Examination (RCE)	750.00
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 750.00

SUBMITTED BY

Name (Print/Type) Bruce B. Brunda

Registration No. 28,497
(Attorney/Agent)

Telephone 949-855-1246

Signature

B. B. Brunda

Date 1/9/03

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Date Mailed: January 9, 2003 Docket No.: NORTH-390A
Serial No.: 09/554,762
Filing Date: April 7, 2000
Title: RUGGED SHOCK RESISTANT BACKPLANE FOR EMBEDDED SYSTEMS

Papers transmitted herewith:

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590 04/11/2003
Terry J Anderson Esq
Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 92677-2199



EXAMINER

SEDIGHIAN, REZA

ART UNIT PAPER NUMBER

2633

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PATENT DEPARTMENT

Office Action Summary

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

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1. This communication is responsive to applicant's 1/14/2003 amendments in the application of Shannon Mary Nelson et al. for "Rugged shock resistant backplane for embedded systems" filed 4/7/2000. The amendments have been entered. Claims 1-15 are now pending.

2. Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As to claim 1, 8, and 15, specification does not clearly describe about circuit cards that are maintained in fixed relationship to one another via a common backplane to maintain continuous optical intercard communications between each of the circuit cards when the circuit cards become intermittently dislodged from electrical connection to the backplane.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 6-9, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karstensen et al. (US patent No: 5,923,451) in view of Davidson (US patent No: 6,160,653).

Regarding claims 1, 8, and 15, as it is understood in view of above 112 problem, Karstensen discloses a shock-resistant system (fig. 1) for interconnecting circuit cards (1, fig. 1)

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to enable data to be transmitted and received therebetween (col. 1, lines 5-11, col. 4, lines 65-67, col. 5, lines 1-2), comprising: a common backplane (col. 5, line 3 and 10, fig. 1) having a plurality of circuit card connectors (col. 5, line 6) disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship (electronic devices 1 are arranged in a parallel relationship with respect to each other); a plurality of circuit cards (1, fig. 1), each being mounted to one of the circuit card connectors (col. 5, lines 5-6) and having a transmitter LED (1, 4, fig. 2) and a receiver photodiode formed thereon (1, 5, fig. 2); an optical pathway formed between each of the circuit cards (figure 2 shows electronic devices 1 are optically connected to each other), each optical pathway forming a respective independent parallel optical connection between the transmitter LED (4, fig. 2) on one of the circuit cards (1, fig. 2) and the receiver photodiode (5, fig. 2) on any one of the circuit cards (col. 6, lines 4-15); and wherein the circuit cards are maintained in fixed relationship to one another via the common backplane to maintain continuous optical intercard communications between each of the circuit cards (col. 6, lines 15-16), and the intercard communications being conducted independent of shock-susceptible wired connectors (col. 5, lines 44-46). Karstensen differs from the claimed invention in that Karstensen does not specifically disclose the interconnected circuit cards are within a computer system. Davidson teaches the interconnection of optical circuit cards (100, 104, fig. 8) within a computer system (col. 12, lines 14-28). One of the ordinary skill in the art would have been motivated to incorporate a plurality of interconnected optical circuit cards within a computer system to provide a high speed data communication between the elements of the computer system. As it is taught by Davidson, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the

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ones of Karstensen within a computer system to provide a high speed optical data communication between the sub-system elements within a computer and to increase the bandwidth.

Regarding claims 2 and 9, Karstensen discloses optically transmitted infrared radiation (col. 6, lines 6-8).

Regarding claims 6 and 13, Karstensen discloses the first and second circuit cards (1, fig. 1) are operative to run an embedded application (col. 6, lines 15-42).

Regarding claims 7 and 14, Karstensen disclose the system comprises a multiplicity of circuit cards (1, figs. 1, 2) each having an LED (4, fig. 2) and a photodiode (5, fig. 2) formed thereon and the circuit cards are being operative to transmit and receive data via LEDs and photodiodes with respective other circuit cards (col. 6, lines 4-15).

5. Claims 3-4 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karstensen et al. (US patent No: 5,923,451) in view of Davidson (US patent No: 6,160,653) and in further view of Croft et al. (US Patent No: 5,864,708).

Regarding claims 3-4 and 10-11, the combination of Karstensen and Davidson differs from the claimed invention in that Karstensen and Davidson do not specifically disclose the transmission and reception signals comprise a standardized infrared communication scheme protocol that is developed by the infrared data association. Croft discloses wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Infrared Data Association standards or protocols such as

the one discussed by Croft for the optical data transmission and reception in the modified optical communication systems of Karstensen and Davidson in order to provide a reliable method of data transmission by implementing a standard Infrared protocol to detect transmission errors and to avoid collisions.

6. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karstensen et al. (US patent No: 5,923,451) in view of Davidson (US patent No: 6,160,653) and in further view of Barina (US Patent No: 4,829,596).

Regarding claims 5 and 12, the combination of Karstensen and Davidson differs from the claimed invention in that Karstensen and Davidson do not disclose the first and second circuit cards are housed within an enclosure. Barina discloses a housing (12, fig. 1) which includes a series of slots that receive a plurality of circuit boards (16-18, fig. 1) that are connected to a mother board which extends along the back surface of the housing to a backplane (col. 2, lines 55-61 and 11, fig. 1). It is inherent that electrical or optical components are housed within a housing for the reason of safety and protection, and it would have been obvious to provide an enclosure such as the one Barina for the optical circuit cards in the modified optical communication system of Karstensen and Davidson in order to protect its components and to provide safety for the users.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad R Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

M. R. Sedigh
Mohammad Sedighian
Patent Examiner
Art Unit : 2633

Notice of References Cited	Application/Control No. 09/544,762	Applicant(s)/Patent Under Reexamination NELSON ET AL.	
	Examiner M. R. Sedighian	Art Unit 2633	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-5,923,451	07-1999	Karstensen et al.	359/163
	B	US-6,160,653	12-2000	Davidson, Howard L.	359/163
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

ATTORNEY DOCKET NO: NORTH-390Q
TITLE: RUGGED SHOCK RESISTANT BACKPLANE FOR EMBEDDED
SYSTEMS

Certificate of Mailing under 37 CFR 1.8 or 37 CFR 1.10

☒ I hereby certify that this correspondence is being deposited with the
United States Postal Service with sufficient postage as first class mail in
an envelope addressed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on June 26, 2003



(Signature)

Dawn A. Sacks

(Typed name of person signing certificate)

Note: Each paper must have its own certificate of mailing, or this
certificate must identify each submitted paper.

1. Amendment (of 11 pages);
2. Transmittal Letter;
3. Certificate of Mailing; and
4. Postcard.

Case No.: NORTH-390Q

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Shannon Mary Nelson	)	Group No.:	2633
)		
Serial No.:	09/554,762)		
)		
Filed:	April 7, 2000	)	Examiner:	SEDIGHIAN, BEZA
)		
For:	RUGGED SHOCK RESISTANT)		
	BACKPLANE FOR EMBEDDED)		
	SYSTEM)		

TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Enclosed for filing are the following:

1. Amendment (of 11 pages);
2. Transmittal Letter;
3. Certificate of Mailing; and
4. Postcard.

If any additional fee is required, please charge Deposit Account Number 19-4330.

Respectfully submitted,

Date: June 26, 2003 By: Bruce B. Brunda
Bruce B. Brunda
Registration No. 28,497
STETINA BRUNDA GARRED & BRUCKER
75 Enterprise, Suite 250
Aliso Viejo, California 92656
Telephone: (949) 855-1246

Dear Sir:

Please date stamp and return this card,
adding the serial number assigned where
applicable.

Date Mailed: June 26, 2003

Serial No.: 09/118,838

Filing Date: April 07, 2000

Title: RUGGED SHOCK RESISTANT
BACKPLANE FOR EMBEDDED
SYSTEMS

Papers transmitted herewith:
Amendment (of 11 pages); Transmittal Letter; Certificate of
Mailing; and Postcard.

(BBB/ds)

Docket Number: NORTH-390Q

FROM:

Stetina Brunda Garred & Brucke
LAW OFFICES
PATENT, TRADEMARK, AND COPYRIGHT CAUSES
75 ENTERPRISE, SUITE 230
ALISO VIEJO, CALIFORNIA 92656

TO:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FIRST CLASS MAIL

Case No.: NORTH-390Q
Patent Appln. 09/118,838

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Shannon Mary Nelson)	
	)	Group No.: 2633
Serial No.: 09/554,762)	
	)	Examiner: SEDIGHIAN, BEZA
Filed: April 07, 2000)	
)	
For: RUGGED SHOCK RESISTANT)	
BACKPLANE FOR EMBEDDED SYSTEMS)	

AMENDMENT

Box AF
ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON D C 20231

Dear Sir/Madam:

In response to the Office Action dated April 11, 2003 in relation to the above-identified application, please amend the application as follows:

In The Claims

1. (Currently Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a plurality of circuit cards, each of said circuit cards being mounted to one of said circuit card connectors, each of said circuit cards having a transmitter LED and a receiver photodiode formed thereon;

c) an optical pathway formed solely through air between each of said circuit cards, each optical pathway forming a respective independent parallel optical connection between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards; and

d) wherein said circuit cards are maintained in fixed relationship to one another via said common backplane to maintain continuous optical intercard communications between each of said circuit cards ~~when said circuit cards become intermittently dislodged from electrical connection to said back plane, said intercard communications being conducted independent of shock-susceptible wired connectors~~ such that the LED on each circuit card is operative to generate and transmit a signal, and the photodiode of one corresponding circuit card is operative to receive the signal through the corresponding optical pathway.

2. (Currently Amended) The system of Claim 1 wherein said signals generated by said ~~first and second~~ transmitter LEDs and received by said ~~first and second receiver~~ photodiodes comprise

optically transmitted infrared radiation.

3. (Currently) The system of Claim 2 wherein said transmission and reception of signals between said ~~first and second~~ transmitter LEDs and said ~~first and second~~ receiver photodiodes comprise a standardized infrared communications scheme protocol.

4. (Original) The system of Claim 3 wherein said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

5. (Currently Amended) The system of Claim 1 wherein said ~~first and second~~ circuit cards are housed within an enclosure.

6. (Currently Amended) The system of Claim 1 wherein said ~~first and second modules~~ circuit cards are operative to run an embedded application.

7. (Canceled)

8. (Currently Amended) A method for operatively interconnecting circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally parallel upright relationship;

b) providing a plurality of circuit cards each having a transmitter LED diode and a receiver photodiode formed thereon;

c) mounting said circuit cards to said corresponding circuit card connectors to establish a plurality of optical pathways between the LED diodes and the photodiodes of the corresponding circuit cards, such that a plurality of independent parallel optical connections between the circuit cards are formed solely through air;

d) generating and transmitting a light from the LED diode of at least one of the circuit cards along the corresponding optical pathway, the light generated from the LED carrying data to be transmitted from the at least one circuit card; and forming an optical pathway between each of said circuit cards;

e) receiving the light transmitted along the corresponding optical pathway by the photodiode of the corresponding circuit card, so as to receive the data carried by the light by the corresponding circuit card ~~forming independent parallel optical connections between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards; and~~

f) ~~spatially arranging each of said circuit cards to relative to one another via said common backplane to maintain continuous optical intercard communications between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercommunications being conducted independent of shock-susceptible wired connectors.~~

9. (Currently Amended) The method of Claim 8 wherein in steps d) and e) ~~step f)~~, said signal light generated by said ~~first and second transmitter LEDs~~ LED and received by said ~~first and second receiver photodiodes~~ photodiode comprise optically transmitted infrared radiation.

10. (Currently Amended) The method of Claim 8 wherein in ~~step f)~~ said transmission and reception of signals the light transmitted between from said LED to said photodiode ~~first and second transmitter LEDs and said first and second receiver photodiodes~~ comprise a standardized infrared communications scheme protocol.

11. (Currently Amended) The method of Claim 8 10 wherein ~~in step f)~~, said infrared

communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. (Currently Amended) The method of Claim 10 wherein ~~step f)~~, said ~~first and second~~ circuit cards are housed within an enclosure.

13. (Currently Amended) The method of Claim 8 wherein ~~in step f)~~, said ~~first and second~~ circuit cards are operative to run an embedded application.

14. (Canceled)

15. (Currently Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) at least a first and a second ~~a plurality of~~ circuit cards, ~~each of said first and second circuit cards having an optical communications device~~ a pair of first LED and photodiode and a pair of second LED and photodiode formed thereon, respectively, the first and second LED's being operative to generate and transmit infrared signals which carry data to be transmitted from the first and second circuit cards, respectively, and the first and second photodiode being operative to receive the infrared signal generated by the second and the first LED's, respectively;

c) ~~an~~ a first optical pathway formed between the first LED and the second photodiode, and a second optical pathway formed between the second LED and the first photodiode, each of said circuit cards, each optical pathway forming a respective independent parallel optical connection between said optical communications devices; and

d) wherein ~~each of said~~ the first and second circuit cards are maintained in fixed relationship to one another, such that the first optical pathway is parallel to the second optical pathway, and the infrared signals are transmitted along the first and second optical pathways independently with each other ~~via said common backplane to maintain continuous optical intercard communications between each of said circuit cards when said circuit cards become intermittently dislodged from electrical connection to said backplane, said intercard communications being conducted independent of shock-susceptible wired connectors.~~

16. (New) The system of Claim 15, wherein the computer system includes a digital camera or a hand-held data collection device.

REMARKS

This is in response to the Office Action dated March 11, 2003. Claims 1-3, 5-6, 8-13 and 15 have been amended as above, Claims 4, 7 and 14 have been canceled without prejudice or disclaimer, and Claim 16 has been respectfully submitted as above. It is respectfully submitted that as amended all pending claims are allowable.

Rejection Under 35 U.S.C. 112, first paragraph

Claims 1, 8 and 15 have been amended as above to overcome the rejection under 35 U.S.C. 112, first paragraph.

Rejection Under 35 U.S.C. 103(a)

Claims 1-2, 6-9, and 13-15 were rejected under 35 U.S.C. 103(b) as being unpatentable over Karstensen et al. (US patent No: 5,923,451) in view of Davidson (US patent No: 6,160,653).

The Applicant respectfully traverses such rejection because the reference Davidson (US patent No:6,160,653) cited in the Office Action is not a valid prior art. This reference, Davidson was not described in a printed publication or patented until December 12, 2000, which was more than six months after the filing date (April 7, 2000) of the current application.

As understood, Karstensen et al. discloses a bus formed by transmission channels (31) to bring electronic devices into communication with each other (col. 1, lines 44-46). Karstensen et al. further discloses the **optical transmission channels** being **in the form of optical waveguide** to achieve maximally packing density (col. 1, lines 56-58). Fig. 1 shows that the means for connecting devices 1 consists of a number of optoelectronic terminal installations 2 provided from a base element 10, and provided for the respective connection of one of the electronic devices 1

(col. 4, line 66 to col. 5, line 6). As shown in Fig. 5, each of the electronic device 1 has a transmitter 4 and a plurality of receivers 5 (col. 5, lines 12-24). The transmitter 4 is operative to transmit an output 22 to the detectors 323 of the termination installation 2, and the receivers 5 are operative to receive inputs 23 from the transmitter 322 of the termination installation 2 (Fig. 5, col. 8, lines 31-36 and lines 52-57). Therefore, as understood, the signal generated by the transmitted 4 of one electronic device 1 is received by the detector(s)/receiver(s) 5 of another electronic device(s) 1 via the optical channels 31 and the termination installation 2. Karstensen et al. further discloses the transmitter 4 as a semiconductor laser (col. 11, lines 33-35).

Therefore, regarding Claim 1, Karstensen et al. only teaches the transmitter 4 as a semiconductor laser, but fails to teach the circuit card having a LED. Further, Karstensen specifically teaches the signal generated by the transmitter 4 is received by the receiver 5 of other electronic devices **via the optical channels 31 in the form of optical waveguides and the termination installations 2**. The signal transmitted between the transmitter and the receiver as disclosed by Karstensen et al. is thus transmitted through hard wire, that is, the channels 31 and the terminal installations 2. Therefore, Karstensen et al. teaches away the photodiode being operative to receive the signal generated by the LED **through the optical pathway formed solely through air**.

In addition to the above, the Examiner indicates that Karstensen et al. differs from the current application in that Karstensen does not specifically disclose the interconnected circuit cards are within a computer system.

Regarding Claims 2 and 9, the Examiner stated that “*Karstensen discloses optically*

transmitted infrared radiation (col. 6, lines 6-8)". What col. 6, lines 6-8 has disclosed is "Each device 1 comprises one optical transmitter 4 per transmission channel 31, which transmitter transmits optical signals on this channel 31, and one optical receiver 5, which receives optical signals from this channel 31". The Applicant cannot find any teaching suggesting or disclosing optically transmitted infrared radiation as indicated by the Examiner. Karstensen et al. further teaches the transmitter 4 and the transmitter 322 being semiconductor laser, which is apparently more costly compared to LED, and requires much more power for generating the optical signal. Without teaching the infrared radiation transmission, the advantages and characteristics of such as low-cost, high-speed, short range, line of sight, point-to-point cordless data transfer cannot be achieved.

Regarding Claims 6 and 13, Karstensen et al. discloses when one electronic device 1 transmits on one or all channels 31, one or a plurality of other electronic devices 1 may listen via the channels 31. The Applicant cannot find any teaching from Karstensen disclosing the circuit cards being operative to run an embedded application apart from the transmitting and receiving functions of the electronic devices 1 via the channels 31.

Regarding Claim 8, similarly to Claim 1, Karstensen et al., though teaches the electronic devices each having a transmitter 4 and a plurality of receivers 5, fails to specifically teach providing the circuit cards each having a LED and a photodiode. Further, Karstensen et al. teaches away "to establish an optical pathway **solely through air** between the LED diode of each circuit card and the photodiode of the corresponding circuit card" by specifically teaching the optical transmission channels 31 in the form of optical waveguides, and inputting and outputting to and

from the electronic devices 1 via the installation terminals 2.

Regarding Claim 15, again, Karstensen et al. fails to teach the LED diode and the photodiode. Karstensen et al. also fails to teach the infrared signals transmitted between the LED diodes and the photodiodes.

Claims 3-4 and 10-11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Karstensen et al. (US patent No: 5,293,451) in view of Davidson (US patent No: 6,160,653) and in further view of Croft et al. (US Patent No: 5,864,708).

Firstly, the rejection over Claims 3-4 and 10-11 is respectfully traversed because the cited reference Davidson (US patent No: 6,160,653) is not a valid prior art because this cited reference is described in a printed publication or patented before the invention as claimed.

Further, by failing to explicitly or implicitly teach the circuit cards having LED and photodiode, Karstensen et al. and Croft et al., in combination or individually, further fails to teach the optically transmitted infrared radiation generated by the LED, and the standardized infrared communications scheme.

Newly Added Claim

In Claim 16, the computer system includes a digital camera or a hand held data collection device. Neither Karstensen et al. nor Croft et al. has disclosed the digital camera or the hand held data collection as claimed.

The rejections over 35 U.S.C. 102(b) and 103(a) are respectfully traversed and a notice of Allowance is thus respectfully solicited. Should the Examiner have any suggestions for expediting

allowance of the application, please contact applicant's representative at the telephone number listed below

Respectfully submitted,

Date: June 25, 2003

By: Bruce B. Brunda

Bruce B. Brunda
Registration No. 28,947
STETINA BRUNDA GARRED & BRUCKER
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Aliso Viejo, CA 92656
(949) 855-1246

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590 09/30/2003
Terry J Anderson Esq
Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 92677-2199

RECEIVED
OCT 06 2003
PATENT DEPARTMENT

EXAMINER

SEDIGHIAN, REZA

ART UNIT PAPER NUMBER

2633

DATE MAILED: 09/30/2003

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-13,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-13,15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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1. This communication is responsive to applicant's 6/30/2003 amendments in the application of Shannon Mary Nelson et al. for "Rugged shock resistant backplane for embedded systems" filed 4/7/2000. The amendments have been entered. Claims 1-6, 8-13, and 15-16 are now pending.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 6, 8-9, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653).

Regarding claims 1, 8, and 15, Ahmad discloses a shock-resistant system (10, fig. 1 and 32, fig. 4) for interconnecting circuit cards (14g, 14h, fig. 1 and 34, fig. 4) to enable data to be transmitted and received therebetween (col. 3, lines 40-42, col. 5, lines 24-27), comprising: a common backplane (12, fig. 1 and 38, fig. 4) having a plurality of circuit card connectors (col. 3, lines 53-59 and 15, fig. 2) disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship (chips 14a-i are arranged in a parallel relationship with respect to each other); a plurality of circuit cards (14g, 14h, fig. 1 and 34, 36, fig. 4), each being mounted to one of the circuit card connectors (col. 3, lines 55-58) and having a transmitter LED (20a, fig. 3A) and a receiver photodiode formed thereon (22b, fig. 3A); an optical pathway (25, fig. 2) formed solely through air between each of the circuit cards (col. 4, lines 10-15), each optical pathway forming a respective independent parallel optical connection between the

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transmitter LED (20a, fig. 3A) on one of the circuit cards (14g, fig. 3A) and the receiver photodiode (22a, fig. 4) on any one of the circuit cards (14h, fig. 3A and col. 4, lines 15-20); and wherein the circuit cards (14g, 14h, fig. 3A) are maintained in fixed relationship to one another via the common backplane (12, fig. 3A) to maintain continuous optical intercard communications between each of the circuit cards such that the LED on each circuit card is operative to generate and transmit a signal and the photodiodes of one corresponding circuit card is operative to receive the signal through the corresponding optical pathway (col. 4, lines 15-21). Ahmad differs from the claimed invention in that Ahmad does not specifically disclose the interconnected circuit cards are within a computer system. Davidson teaches the interconnection of optical circuit cards (100, 104, fig. 8) within a computer system (col. 12, lines 14-28). One of the ordinary skill in the art would have been motivated to incorporate a plurality of interconnected optical circuit cards within a computer system to provide a high speed data communication between the elements of the computer system. As it is taught by Davidson, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the ones of Ahmad within a computer system to provide a high speed optical data communication between the sub-system elements within a computer to increase the bandwidth. As to claim 15, Ahmad teaches a pair of first LED and photodiode (20a, 22b, fig. 3A) and a pair of second LED and photodiode (20b, 22a, fig. 3A).

Regarding claims 2 and 9, Ahmad discloses optically transmitted infrared radiation (col. 3, line 25-27).

Regarding claims 6 and 13, Ahmad discloses the first and second circuit cards are operative to run an embedded application (col. 5, lines 30-33).

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4. Claims 3-4 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in further view of Croft et al. (US Patent No: 5,864,708).

Regarding claims 3-4 and 10-11, the combination of Ahmad and Davidson differs from the claimed invention in that Ahmad and Davidson do not specifically disclose the transmission and reception signals comprise a standardized infrared communication scheme protocol that is developed by the infrared data association. Croft discloses wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Infrared Data Association standards or protocols such as the one discussed by Croft for the optical data transmission and reception in the modified optical communication systems of Ahmad and Davidson in order to provide a reliable method of data transmission by implementing a standard Infrared protocol to detect transmission errors and to avoid collisions.

5. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in further view of Barina (US Patent No: 4,829,596).

Regarding claims 5 and 12, the combination of Ahmad and Davidson differs from the claimed invention in that Ahmad and Davidson do not disclose the first and second circuit cards are housed within an enclosure. Barina discloses a housing (12, fig. 1) which includes a series of slots that receive a plurality of circuit boards (16-18, fig. 1) that are connected to a mother board

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which extends along the back surface of the housing to a backplane (col. 2, lines 55-61 and 11, fig. 1). It is inherent that electrical or optical components are housed within a housing for the reason of safety and protection, and it would have been obvious to provide an enclosure such as the one Barina for the optical circuit cards in the modified optical communication system of Ahmad and Davidson in order to protect it's components and to provide safety for the users.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in further view of Cargin, Jr. et al. (US Patent No: 6,023,147).

Regarding claim 16, the combination of Ahmad and Davidson differs from the claimed invention in that Ahmad and Davidson do not disclose the computer system includes a hand-held data collection device. Cargin discloses a hand-held data collection device (col. 3, lines 55-60 and 10, fig. 1) that includes a plurality of circuit cards (col. 10, lines 22-29). Therefore, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the ones of Ahmad within a computer system such as of Davidson, or within a data collection device such as of Cargin to provide a high speed optical data transmission between sub-system elements of the computer system to increase the bandwidth.

7. Applicant's arguments with respect to claims 1, 8, and 15 have been considered but are moot in view of the new ground(s) of rejection.

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8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

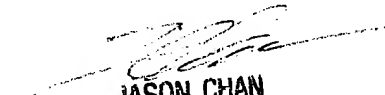
Mitchell et al. (US patent No: 6,438,684) is cited to show an embedded application can be stored in a memory on a card of a computing system, and the card can comprises an embedded processor for performing an embedded application (col. 10, lines 50-54).

Art Unit: 2633

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad R Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.


JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Notice of References Cited

Application/Control No.

09/544,762

Applicant(s)/Patent Under
Reexamination
NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-5,818,984	10-1998	Ahmad et al.	385/14
	B	US-6,023,147	02-2000	Cargin et al.	320/114
	C	US-6,438,684	08-2002	Mitchell et al.	713/1
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

ATTORNEY DOCKET NO: NORTE-390Q
TITLE: RUGGED SHOCK RESISTANT BACKPLANE FOR EMBEDDED SYSTEM

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PTO/SB/21 (08-00)


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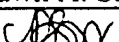
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/544,762
	Filing Date	04/07/2000
	First Named Inventor	Shannon Mary Nelson
	Group Art Unit	2633
	Examiner Name	Reza Sedighian
Total Number of Pages in This Submission	Attorney Docket Number	NORTE-390Q

ENCLOSURES (check all that apply)		
<input type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Assignment Papers (for an Application)	<input type="checkbox"/> After Allowance Communication to Group
<input type="checkbox"/> Fee Attached	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input checked="" type="checkbox"/> Amendment / Reply	<input type="checkbox"/> Licensing-related Papers	<input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)
<input checked="" type="checkbox"/> After Final	<input type="checkbox"/> Petition	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/declaration(s)	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Status Letter
<input type="checkbox"/> Extension of Time Request	<input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address	<input checked="" type="checkbox"/> Other Enclosure(s) (please identify below):
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<input type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> Request for Refund	
<input type="checkbox"/> Certified Copy of Priority Document(s)	<input type="checkbox"/> CD, Number of CD(s) _____	
<input type="checkbox"/> Response to Missing Parts/ Incomplete Application	Remarks	
<input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Bruce B. Brunda STETINA BRUNDA GARRED & BRUCKER
Signature	
Date	December 26, 2003

CERTIFICATE OF MAILING			
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on this date: 12/26/03			
Typed or printed name	Dawn A. Sacks		
Signature		Date	December 26, 2003

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Application No.: 09/544,762
Response to Office Action of 09/30/03
Attorney Docket: Norte-390Q

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Shannon Mary Nelson	)	Confirmation No.	9968
)		
Serial No.:	09/544,762	)	Art Unit:	2633
)		
Filed:	04/07/2000	)	Examiner:	Sedighian,
		)		Reza
For:	Rugged Shock Resistant Backplane)		
	for Embedded System)		

RESPONSE AFTER FINAL OFFICE ACTION

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action of September 30, 2003, the Applicant respectfully presents the Claims as follows:

Amendments to the Claims:

1. (Currently amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting of circuit cards in a generally upright parallel relationship;

b) a plurality of circuit cards, each of said circuit cards being mounted to one of said circuit connectors, each of said circuit cards having a transmitter LED and a receiver photodiode formed thereon;

c) ~~an~~ a plurality of optical pathway pathways formed solely through air between ~~each~~ of said circuit cards, ~~each the~~ optical ~~pathways~~ pathway forming a ~~respective~~ plurality of independent ~~parallel~~ optical connections ~~connection~~ between said transmitter LED on at least one of said circuit cards and said receiver ~~photodiode~~ photodiodes on ~~any one of said the~~ other circuit cards; and

d) wherein said circuit cards are maintained in fixed relationship to one another via said common backplane to maintain continuous optical intercard communications between each of said circuits such that the LED on each circuit card is operative to generate and transmit a signal, and the photodiode of one corresponding circuit card is operative to receive the signal through the corresponding optical pathway.

2. (Previously Amended) The system of Claim 1 wherein said signals generated by said transmitter LEDs and received by said photodiodes comprise optically transmitted infrared radiation.

3. (Previously Amended) The system of Claim 2 wherein said transmission and reception of signals between said transmitter LEDs and said receiver photodiodes comprise a standardized infrared communications scheme protocol.

4. (Previously Amended) The system of Claim 3 wherein infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

5. (Previously Amended) The system of Claim 1 wherein said circuit cards are housed within an enclosure.

6. (Previously Amended) The system of Claim 1 wherein said circuit cards operative to run an embedded application.

7. (Canceled)

8. (Currently Amended) A method for operatively interconnecting circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards extending normal to the backplane in a generally parallel upright relationship;

b) providing a plurality of circuit cards each having a transmitter LED diode and a receiver photodiode formed thereon;

c) mounting said circuit cards to said corresponding circuit cards connectors to establish a plurality of optical pathways between the LED diodes and the photodiodes of the corresponding circuit cards, such that a plurality of independent ~~parallel~~ optical connections between the circuit cards are formed solely through air;

d) generating and transmitting a light from at least one of the LED diode diodes of at least one of the circuit cards along the corresponding optical pathway, the light generated from the LED carrying data to be transmitted from the ~~at least one~~ circuit card on which the at least one LED diode is formed; and

e) receiving the light ~~transmitted along the corresponding optical pathway~~ by the photodiode of ~~the corresponding~~ formed on any of the circuit card cards, so as to receive the data carried by the light ~~by the corresponding circuit card~~.

9. (Previously Amended) The method of Claim 8 wherein in steps d) and e), said light generated by said LED and received by said photodiode comprise optically transmitted infrared radiation.

10. (Previously Amended) The method of Claim 8 wherein the light transmitted from said photodiode comprise a standardized infrared communications scheme protocol.

11. (Previously Amended) The method of Claim 10 wherein said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. (Previously Amended) The method of Claim 10 wherein said circuit cards are operative to run an embedded application.

13. (Previously Amended) The method of Claim 8 wherein said circuit cards are operative to run an embedded application.

14. (Canceled)

15. (Currently Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards extending normal to the backplane in a generally upright parallel relationship;

b) at least a first and a second circuit cards, a pair of first LED and photodiode and a pair of second LED and photodiode formed thereon, respectively, the first and second LED's being operative to generate and transmit infrared signals which carry data to be transmitted from the first and second circuit cards, respectively, and the first and second photodiode being operative to receive the infrared signal generated by the second and the first LED's, respectively;

c) a first optical pathway formed between the first LED and the second photodiode, and a second optical pathway formed between the second LED and the first photodiode; and

d) wherein the first and second circuit cards are maintained in fixed relationship to one another, such that the first optical pathway is parallel to the second optical pathway, and the infrared signals are transmitted along the first and second optical pathways independently with each other.

16. (Previously Added) The system of Claim 15, wherein the computer system includes a digital camera or a hand-held data collective device.

REMARKS

This is in response to the Office Action dated September 30, 2003. In the Office Action, the Examiner cited a new reference, Ahmad et al. (US Patent No: 5,818,984), as a primary reference in view of previously cited references to reject Claims 1-6, 8-13, 15 and 16 under 35 U.S.C. 103(a). Claims 1, 8 and 15 have been amended as above. The rejection is respectfully traversed because the Ahmad et al. and all the secondary references, individually or in combination, fail to teach every element as claimed.

SUMMARY

The Office Action rejected independent Claims 1, 8 and 15 under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US Patent No: 5,818,984) in view of Davidson (US Patent No: 6,160,653).

In Claim 1 of Applicant's invention, a plurality of optical pathways is formed solely through air between the circuit cards, and the optical pathways form a plurality of optical connections between the LED on at least one of circuit cards and the photodiodes on the other circuit cards. Ahmad et al., by specifically teaching that optical connection is established only between dedicated pair of transmitter and receiver on adjacent chips, fails to teach a plurality of optical connections between the LED on at least one of circuit cards and the photodiodes on the other circuit cards.

In Claim 8 of Applicant's invention, the backplane having a plurality of circuit card connectors ... for supporting circuit cards extending normal to the backplane in a generally upright and parallel relationship. As a result, the light generated from at least one of the LED is received by the photodiode formed on **any of the circuit cards**. In other words, the light can not only be transmitted between adjacent circuit cards, but can also be transmitted between circuit cards which are not adjacent to each other. Ahmad et al., by specifically teaching the edge-to-edge arrangement of the chips and the optical signal transmission limited between adjacent circuit cards, teaches away Claim 8.

With regard to Claim 15 of Applicant's invention, Ahmad et al. fails to teach the circuit cards extending normal to the backplane and the **infrared signal** as claimed.

Davidson et al. teaches electrical signal transmission between circuit cards being converted into optical signal. However, Davidson et al. fails to teach optical connections between circuit cards.

Therefore, the rejection over Claims 1, 8 and 15, and the dependent claims thereof, is respectfully traversed because both Ahmad et al. and Davidson, individually or in combination, fail to teach every element as claimed.

The Amendment

In Claim 1(c), the teaching of “optical connections between the LED on at least one of the circuit cards and the photodiodes of the other circuit cards” is fully supported by the disclosure that states “*an optical pathway can be established between the respective LED and photodiodes 22, 24 of each respective module*” in page 9, lines 27-31 and Figure 2.

In Claims 8 and 15, the teaching of “circuit cards extending normal to the backplane” has been added. In other words, the circuit cards are mounted to the backplane in an upright relationship. Such teaching is not only supported in Figures 1 and 2, but is also supported by Claims 1, 8 and 15 as previously claimed in Claims 1, 8 and 15.

As the amendments have been fully supported by the specification, no new subject matter has been added.

The Ahmad reference

Ahmad et al. teaches that “*multi-chip 10 comprises interconnection substrate 12 and an array of chips 14a-i arranged edge-to-edge*” (Figs. 1-3 and col. 3, lines 53-56). Following the disclosure of edge-to-edge arrangement of the chips 14a-i, Ahmad et al. further teaches “*Each optical transmitter of one chip transmits optical signals across the gap or space between adjacent chips*” (Figs. 1-3, col. 3, lines 46-48).

The teaching of “edge-to-edge” arrangement of the chips disclosed by Ahmad et al. teaches away “the connectors for supporting circuit cards extending normal to the backplane in generally upright and parallel relationship as claimed in Claims 8 and 15” in Applicant’s invention.

As understood, the teaching of “connectors for supporting circuit cards extending normal to the backplane in generally upright and parallel relationship” is not simply a design choice. It allows the optical connections to be established between one LED and multiple photodiodes as claimed in Claim 1(c), and the optical connection established between the LED on one of the circuit cards and the photodiode on any of the other circuit cards as claimed in Claim 8 of Applicant’s invention. For example, as shown in Figure 2 of Applicant’s invention, the optical signal generated by the LED 22 formed on the module 3 can be transmitted to photodiodes 24 formed on both of the modules 1 and 2; or alternatively, to the photodiode 24 formed on either one of the module 1 or the module 2.

Therefore, by teaching away the “connectors for supporting the circuit cards extending normal to the backplane” as claimed in Claims 8 and 15, Ahmad et al. consequently fails to teach “the optical connections formed between the LED on at least one of the circuit cards and the photodiodes of the other circuit cards” as claimed in Claim 1(c) of Applicant’s invention, and “the optical connection between the LED on one of the circuit cards and the photodiode on any one of the other circuits” as claimed in Claim 8 of Applicant’s invention.

Ahmad et al. also fails to disclose such module being a **shock-resistant system** as claimed in Claims 1 and 15, and the infrared signal transmitted by the first and second LED’s as claimed in Claim 15. It is known in the art that even though the circuit cards mounted to the backplane are located within an enclosure, ambient stray light from various visible or ultra-violet light sources including sun, lamps and other devices cannot be completely blocked from entering the enclosure. If the wavelength of the optical signals/connections is within the range of visible light or even ultra-violet light, the optical connection is easily interfered by ambient light. Therefore, in Claim 15 of Applicant’ invention, infrared radiation is selected as the optical connections transmitted between the LED and the photodiode to suppress or eliminate interference by ambient light.

The Examiner stated that “*Ahmad discloses optically transmitted infrared radiation* (col. 3, lines 25-27)”. However, what is disclosed in col. 3, lines 25-27 of Ahmad et al. is a brief description of Fig. 3A and 3B. Ahmad et al. does not disclose infrared radiation/signal.

The Davidson Reference

Davidson teaches an input optical connector card 100 electrically linked with the connector 96 by a set of signal lines 98. The input optical connector card 100 includes a set of signal drivers 102. The signal drivers 102 process electrical signals from the connector 96 and convert them into appropriate driver signals for an array of light producing devices 104 (Col. 9, lines 14-19).

Davidson fails to teach the upright relationship of the circuit cards supported by the circuit card connectors. Davidson also fails to teach the optical pathway formed solely through air forming a respective independent parallel optical connection between said transmitter LED on one of said circuit cards and said receiver photodiode on any one of said circuit cards.

As Ahmad et al. and Davidson, individually or in combination, fails to teach every element as claimed, a *prima facie* case of obviousness is not established. The rejection over Claims 1, 8 and 15, and the dependent Claims 2-6, 9-13 and 16 thereof is respectfully traversed.

The Dependent Claims

Regarding Claims 2 and 9, the Examiner indicated "*Ahmad discloses optically transmitted infrared radiation (col. 3, lines 25-27)*". However, what has been disclosed By Ahmad et al. in col. 3, lines 25-27 is "*Fig. 1. Fig. 3A is a top plane view along lines 3A-3A of Fig. 2. Fig. 3B is a perspective view of an optical beam generator*". The Applicant cannot find the teaching of infrared radiation throughout the whole specification of Ahmad et al.

The Office Action further rejected Claims 3-4 and 10-11 by combining Croft et al. (US Patent No: 5,864,708) with Ahmad et al. and Davidson.

Neither Ahmad et al. nor Davidson teaches the infrared radiation between circuit cards as claimed in Claims 2, 9 and 15. Croft discloses a wireless transceiver 63 within portable computer communicates with a wireless transceiver 64 within a docking station 62. Apparently, the infrared communications is established between the computer and a device external to the computer. Croft fails to teach the wireless communication established

between the circuit cards **within** the computer. There is no teaching or suggestion in the cited references for one skilled in art to modify Croft by converting the external infrared communication into the internal infrared communication within the computer. Consequently, there shows no motivation for one skilled in the art to first modify the teaching in Croft, and then combine the modification of Croft with Davidson and Ahmad et al. into the invention as claimed in Claims 3-4 and 10-11. It appears that the combination proposed by the Examiner is constructed by hindsight of the Applicant's claimed invention. It is error to reconstruct a patentee's claimed invention from the prior art by using the patentee's claim as a blueprint. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (CAFC 1983). Although an Examiner may suggest that the structure of a primary prior art reference could be modified in view of a secondary prior art reference to form the claimed structure, the mere fact that the prior art could be so modified would not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Laskowski*, 871 F.2d 115, 10 USPQ2d 1297 (CAFC 1989). There must be some supporting teaching in the prior art for the proposed combination of references to be proper. *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (CAFC 1989).

Claims 5 and 12 are dependent claims of the Claims 1 and 8. As Claims 1 and 8 are patentably distinguishable over the cited reference, Claims 5 and 12 are believed patentable.

The Office Action further rejected Claim 16 as being unpatentable over Ahmad et al. in view of Davidson and in further view of Cargin, Jr. et al. (US Patent No: 6,023,147). Ahmad et al. discloses interconnection between chips mounted to a microelectronic module. Davidson discloses a computer with cards electrically connected by wires, while Cargin, Jr. et al. discloses a hand held computerized data collection terminal. Similarly, as there is no teaching showing desirability for combination in any of the above references, such the combination proposed by the Examiner does not render Claim 16 obvious. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (CAFC 1983). *In re Laskowski*, 871 F.2d 115, 10 USPQ2d 1297 (CAFC 1989). *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (CAFC 1989).

Application No.: 09/544,762
Response to Office Action of 09/30/03
Attorney Docket: Norte-390Q

If any additional fee is required, please charge Deposit Account Number 19-4330.

Respectfully submitted,

Date: Dec 23, 2003

By:

Bruce B. Brunda

Customer No.: 007663

Bruce B. Brunda
Registration No. 28,947
STETINA BRUNDA GARRED & BRUCKER
75 Enterprise, Suite 250
Aliso Viejo, California 92656
Telephone: (949) 855-1246
Fax: (949) 855-6371

C:\Jessie\OfficeAction\North\390q_final.doc

FROM:

LAW OFFICES

Steina Brunda Gared & Brucker

PATENT, TRADEMARK, AND COPYRIGHT CAUSES

75 ENTERPRISE, SUITE 250

ALISO VIEJO, CALIFORNIA 92656

TO:

Mail Stop NON-FEE AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

FIRST CLASS MAIL

Dear Sir:

Please date stamp and return this card,

adding the serial number assigned where applicable.

Date Mailed: December 26, 2003

Serial No.: 09/544,762

Filing Date: 04/07/2000

Title: RUGGED SHOCK RESISTANT
BACKPLANE FOR EMBEDDED

SYSTEM

Docket Number: NORTE-3900

(BBB/ds)

Papers transmitted herewith:

Response After Final Office Action (of 10 pages); Transmittal
Form; Certificate of Mailing; and Return Postcard.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590 02/03/2004

Terry J Anderson Esq
Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 92677-2199



EXAMINER

SEDIGHIAN, REZA

ART UNIT	PAPER NUMBER
----------	--------------

2633

DATE MAILED: 02/03/2004

17

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 30 December 2003 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
- b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.
2. ☒ The proposed amendment(s) will not be entered because:
- (a) ☒ they raise new issues that would require further consideration and/or search (see NOTE below);
 - (b) ☐ they raise the issue of new matter (see Note below);
 - (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
 - (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: See Continuation sheet.

3. ☐ Applicant's reply has overcome the following rejection(s): _____.
4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
5. ☐ The a) ☐ affidavit, b) ☐ exhibit, or c) ☐ request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.
7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☒ will not be entered or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____.

Claim(s) objected to: _____.

Claim(s) rejected: 1-6, 8-13, 15-16.

Claim(s) withdrawn from consideration: _____.

8. ☐ The proposed drawing correction filed on _____ is a) ☐ approved or b) ☐ disapproved by the Examiner.
9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____.
10. ☐ Other: _____.

M. R. Sedighian
M.R. SEDIGHIAN
Patent Examiner
Art Unit: 2633

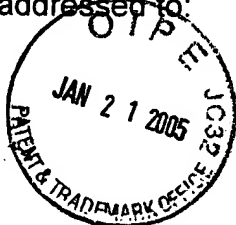
The optical pathways forming a plurality of independent optical connections between the transmitter LED on at least one of the circuit cards and the receiver photodiodes on other circuit cards, of claim 1, and receiving the light by the photodiode of formed on any of the circuit cards, of claim 8, and circuit cards extending normal to the backplane, of claim 15, require further consideration and/or search.

ATTORNEY DOCKET NO: NORTE-390Q

TITLE: RUGGED SHOCK-RESISTANT BACKPLANE FOR EMBEDDED SYSTEMS

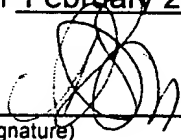
Certificate of Mailing under 37 CFR 1.8 or 37 CFR 1.10

☒ I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to:



Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on February 23, 2004



(Signature)

DAWN A. PRIVETT

(Typed name of person signing certificate)

Note: Each paper must have its own certificate of mailing, or this certificate must identify each submitted paper.

1. RCE Transmittal;
2. Fee Transmittal (in duplicate);
3. Check for \$770.00;
4. Certificate of Mailing; and
5. Return Postcard.

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 770.00

Complete if Known

Application Number 09/544,762
Filing Date 04/07/2000
First Named Inventor Shannon Mary Nelson
Examiner Name Reza Sedighian
Art Unit 2633
Attorney Docket No. NORTE-390Q

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit
Account
Number
Deposit
Account
Name

19-4330

Stetina Brunda Garred & Brucker

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	

SUBTOTAL (1) (\$)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1202 18	2202 9	Claims in excess of 20	
1201 86	2201 43	Independent claims in excess of 3	
1203 290	2203 145	Multiple dependent claim, if not paid	
1204 86	2204 43	** Reissue independent claims over original patent	
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	770.00
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 770.00

SUBMITTED BY

(Complete if applicable)

Name (Print/Type)

Bruce B. Brunda

Registration No.
(Attorney/Agent)

28,497

Telephone (949)855-1246

Signature

B. B. Brunda

Date

February 23, 2004

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Request For Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	09/544,762
Filing Date	04/07/2000
First Named Inventor	Shannon Mary Nelson
Art Unit	2633
Examiner Name	Reza Sedoghian
Attorney Docket Number	NORTE-390Q

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.

Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 CFR 1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

- a. ☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- i. ☐ Consider the arguments in the Appeal Brief or Rely Brief previously filed on _____
- ii. ☐ Other _____

- b. ☐ Enclosed

- i. ☐ Amendment/Reply
- ii. ☐ Affidavit(s)/ Declaration(s)
- iii. ☐ Information Disclosure Statement (IDS)
- iv. ☐ Other _____

2. Miscellaneous

- a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)
- b. ☐ Other _____

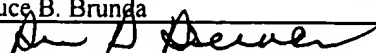
3. Fees

- The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
- The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 19-4330

- a. ☒ RCE fee required under 37 CFR 1.17(e)
- ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)
- iii. ☐ Other _____
- b. ☒ Check in the amount of \$ 770.00 enclosed
- c. ☐ Payment by credit card (Form PTO-2038 enclosed)


WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print/Type)	Bruce B. Brunda	Registration No. (Attorney/Agent)	28,497
Signature		Date	February 23, 2004

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Name (Print/Type)	Dawn A. Privett	Date	February 23, 2004
Signature			

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STETINA BRUNDA GARRED & BRUCKER

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

75 ENTERPRISE, SUITE 250 (949) 875-1246
ALISO VIEJO, CA 92656



CALIFORNIA BANK & TRUST
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Laguna Hills, CA 92653

16-339/1220

U51U55

2/23/04

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GENERAL ACCOUNT

NORTE-390

RCE ADD THE REVERSE SIDE OF THIS DOCUMENT INCLUDES AN ARTIFICIAL WATERMARK - HOLD AT AN ANGLE TO VIEW

051033 1122003396 3030015731

D. Brucker

FROM:

LAW OFFICES

Stetina Brunda Garred & Brucker

PATENT, TRADEMARK, AND COPYRIGHT CAUSES

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ALISO VIEJO, CALIFORNIA 92656

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Mail Stop RCE

Commissioner for Patents

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Alexandria, VA 22313-1450

FIRST CLASS MAIL

(BBB/dp)

Dear Sir:
Please date stamp and return this card,
adding the serial number assigned where
applicable.

Date Mailed: February 23, 2004

Serial No.: 09/544,762

Filing Date: April 7, 2000

Title: RUGGED SHOCK RESISTANT
BACKPLANE FOR EMBEDDED SYSTEM

Docket Number: NORTE-3900

Papers transmitted herewith:

1. RCE Transmittal;
2. Fee Transmittal (in duplicate);
3. Check for \$770.00;
4. Certificate of Mailing; and
5. Return Postcard.



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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,762	04/07/2000	Shannon Mary Nelson	NORTH-390A/A-2241	9968

7590

05/19/2004

Terry J Anderson Esq
Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 92677-2199

RECEIVED

MAY 2 2004

PATENT DEPARTMENT

EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

19

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Final
RESPONSE DUE: 8-19-04
RESPONSE DEADLINE: 11-19-04

Office Action Summary

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-13,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-13,15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Notice of References Cited	Application/Control No. 09/544,762	Applicant(s)/Patent Under Reexamination NELSON ET AL.	
	Examiner M. R. Sedighian	Art Unit 2633	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-3,858,154	12-1974	William, A. Reimer	439/66
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Art Unit: 2633

1. This communication is responsive to applicant's 12/30/2003 amendments in the application of Shannon Mary Nelson et al. for "Rugged shock resistant backplane for embedded systems" filed 4/7/2000. The amendments have been entered. Claims 1-6, 8-13, and 15-16 are now pending.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 1, it recites the limitation "said receiver photodiodes" in line 13, and "said circuits" in line 17. There are insufficient antecedent basis for these limitation in the claim.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2, 6, 8-9, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in further view of William (US patent No: 3,858,154).

Regarding claims 1, as it is understood in view of the above 112 problem, and claims 8 and 15, Ahmad discloses a shock-resistant system (10, fig. 1 and 32, fig. 4) for interconnecting

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circuit cards (14g, 14h, fig. 1 and 34, fig. 4) to enable data to be transmitted and received therebetween (col. 3, lines 40-42, col. 5, lines 24-27), comprising: a common backplane (12, fig. 1 and 38, fig. 4) having a plurality of circuit card connectors (col. 3, lines 53-59 and 15, fig. 2) disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship (chips 14a-i are arranged in a parallel relationship with respect to each other); a plurality of circuit cards (14g, 14h, fig. 1 and 34, 36, fig. 4) each being mounted to one of the circuit card connectors (col. 3, lines 55-58) and having a transmitter LED (20a, fig. 3A) and a receiver photodiode formed thereon (22b, fig. 3A); a plurality of optical pathways (25, fig. 2 and 24, fig. 3A) formed solely through air between the circuit cards (col. 4, lines 10-15), the optical pathways forming a plurality of independent optical connections (note that there are a plurality of optical path ways 24 between transmitters 20a, 20c, 20e of circuit card 14g and the optical receivers 22a, 22c, 22e of the circuit card 14h) between the transmitter LED (20a, fig. 3A) on at least one of the circuit cards (14g, fig. 3A) and the receiver photodiode (22a, fig. 4) on the other circuit cards (14h, fig. 3A and col. 4, lines 15-20); and wherein the circuit cards (14g, 14h, fig. 3A) are maintained in fixed relationship to one another via the common backplane (12, fig. 3A) to maintain continuous optical intercard communications between each of the circuit cards such that the LED on each circuit card is operative to generate and transmit a signal and the photodiode of one corresponding circuit card is operative to receive the signal through the corresponding optical pathway (col. 4, lines 15-21). Ahmad differs from the claimed invention in that Ahmad does not specifically disclose the interconnected circuit cards are within a computer system. Davidson teaches the interconnection of optical circuit cards (100, 104, fig. 8) within a computer system (col. 12, lines 14-28). One of the ordinary skill in the art would have

Art Unit: 2633

been motivated to incorporate a plurality of interconnected optical circuit cards within a computer system to provide a high speed data communication between the elements of the computer system. As it is taught by Davidson, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the ones of Ahmad within a computer system to provide a high speed optical data communication between the sub-system elements within a computer to increase the bandwidth. The modified optical data transmission system of Ahmad and Davidson differs from the claimed invention in that Ahmad and Davidson do not specifically disclose circuit cards are extended normal to a back plane. William teaches a common backplane having a plurality of circuit cards connectors disposed in spaced apart relationship for supporting circuit cards extending normal to the backplane (col. 1, lines 21-31 and figs. 1, 6). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to provide a supporting structure, wherein circuit cards are extended normal to a backplane, as it is taught by William, for the circuit cards and the backplane, in the modified optical data transmission system of Ahmad and Davidson in order to transmit the optical signals at a plurality of different paths and different directions. As to claims 8 and 15, Ahmad further teaches generating and transmitting a light from at least one of the LED diode (for example, transmitter 20a in fig. 3A) and receiving the light by the photodiode formed on any of the circuit cards (for example, by receiver 22a that can be considered as a photodiode that is formed on any one of the circuit cards such as circuit card 14h) to receive the data carried by the light (col. 4, lines 4-17).

Regarding claims 2 and 9, Ahmad discloses optically transmitted infrared radiation (col. 3, line 25-27).

Regarding claims 6 and 13, Ahmad discloses the first and second circuit cards are operative to run an embedded application (col. 5, lines 30-33).

6. Claims 3-4 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in view of William (US patent No: 3,858,154) and in further view of Croft et al. (US Patent No: 5,864,708).

Regarding claims 3-4 and 10-11, the combination of Ahmad, Davidson, and William differs from the claimed invention in that Ahmad, Davidson, and William do not specifically disclose the transmission and reception signals comprise a standardized infrared communication scheme protocol that is developed by the infrared data association. Croft discloses wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Infrared Data Association standards or protocols such as the one discussed by Croft for the optical data transmission and reception in the modified optical communication systems of Ahmad, Davidson, and William in order to provide a reliable method of data transmission by implementing a standard Infrared protocol to detect transmission errors and to avoid collisions.

7. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and William (US patent No: 3,858,154) and in further view of Barina (US Patent No: 4,829,596).

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Regarding claims 5 and 12, the combination of Ahmad, Davidson, and William differs from the claimed invention in that Ahmad, Davidson, and William do not disclose the first and second circuit cards are housed within an enclosure. Barina discloses a housing (12, fig. 1) which includes a series of slots that receive a plurality of circuit boards (16-18, fig. 1) that are connected to a mother board which extends along the back surface of the housing to a backplane (col. 2, lines 55-61 and 11, fig. 1). It is inherent that electrical or optical components are housed within a housing for the reason of safety and protection, and it would have been obvious to provide an enclosure such as the one Barina for the optical circuit cards in the modified optical communication system of Ahmad, Davidson, and William in order to protect it's components and to provide safety for the users.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and William (US patent No: 3,858,154) and in further view of Cargin, Jr. et al. (US Patent No: 6,023,147).

Regarding claim 16, the combination of Ahmad, Davidson, and William differs from the claimed invention in that Ahmad, Davidson, and William do not disclose the computer system includes a hand-held data collection device. Cargin discloses a hand-held data collection device (col. 3, lines 55-60 and 10, fig. 1) that includes a plurality of circuit cards (col. 10, lines 22-29). Therefore, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the ones of Ahmad within a computer system such as of Davidson, or within a data collection device such as of Cargin to provide a

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high speed optical data transmission between sub-system elements of the computer system to increase the bandwidth.

9. Applicant's arguments filed 12/30/2003 have been fully considered but they are not persuasive.

Remark states Ahmad fails to teach a plurality of optical connections between the LED on at least one of the circuit card and the photodiodes on the other circuit cards. However, Ahmad teaches a plurality of optical transmitters 20 on a circuit card 14g that communicate through a plurality of optical pathways 24 with optical receives 22 on another circuit card 14h. Remark further states Ahmad does not disclose infrared signals. Ahmad teaches each optical transmitter of one chip transmits optical signals 24 (col. 4, lines 12-13). Note that optical spectrum generally, the electromagnetic spectrum is within the wavelength region extending from the vacuum ultraviolet at 1 nm to the far infrared at 0.1 mm. Ahmad further teaches the light generated from at least one LED (such as transmitter 20a) is received by the photodiode (such as photodiode 22a) formed on any of the circuit card (such as circuit card 14h). Remark states Ahmad fails to disclose a shock-resistant system. However, it is obvious that electrical or optical components can be housed within a shock-resistant housing for reasons of safety and protection, as such enclosures are taught by Barina. Remark further states Davidson fails to teach the upright relationship of the circuit cards supported by connectors, and fails to teach the optical pathway formed solely through air. However, Davidson is cited to teach circuit cards can be incorporated within a computer system. Remark further states Croft fails to teach wireless communication established between the circuit cards within the computer. Croft is cited to show

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wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (703) 308-9063.

The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

571-272-3022
571-372-3034
M. R. SEDIGHIAN
Patent Examiner
Art Unit: 2633

ATTORNEY DOCKET NO: NORTH-390Q2
TITLE: RUGGED SHOCK RESISTANT BACKPLANE FOR EMBEDDED
SYSTEMS

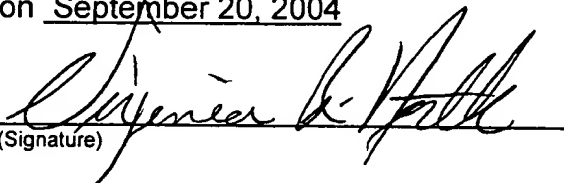
Certificate of Mailing under 37 CFR 1.8 or 37 CFR 1.10

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VIRGINIA R. NORTH
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1. Amendment (of 16 pages);
2. Transmittal Letter;
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/544,762
	Filing Date	April 7, 2000
	First Named Inventor	Shannon Mary Nelson
	Art Unit	2633
	Examiner Name	Sedighian Beza
Total Number of Pages in This Submission	Attorney Docket Number	NORTE-390Q2

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input checked="" type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
Remarks _____		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	BRUCE B. BRUNDA STETINA BRUNDA GARRED & BRUCKER - Customer No. 007663
Signature	<i>B. B. Brunda</i>
Date	Sep 20, 2004

CERTIFICATE OF TRANSMISSION/MAILING		
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below. Washington, DC 20231 on this date:		
Typed or printed name	VIRGINIA R. NORTH	
Signature	<i>Virginia R. North</i>	Date 9-20-04

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 110.00

Complete if Known

Application Number 09/544,762
Filing Date April 7, 2000
First Named Inventor Shannon Mary Nelson
Examiner Name Sedighian Beza
Art Unit 2633
Attorney Docket No. NORTE-390Q2

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit
Account
Number
Deposit
Account
Name

19-4330

Stetina Brunda Garred & Brucker

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) (\$)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Fee Code	Large Entity Fee (\$)	Small Entity Fee Code	Small Entity Fee (\$)	Fee Description	Fee Paid
1202	18	2202	9	Claims in excess of 20	
1201	86	2201	43	Independent claims in excess of 3	
1203	290	2203	145	Multiple dependent claim, if not paid	
1204	86	2204	43	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	110.00
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 110.00

SUBMITTED BY

Name (Print/Type) BRUCE B. BRUNDA

Registration No. 28,497
(Attorney/Agent)

(Complete if applicable)

Telephone (949) 855-1246

Signature

Date

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This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional) NORTE-390Q2

In re Application of Shannon Mary Nelson

Application Number 09/544,762

Filed 04/07/2004

For Rugged Shock Resistant Backplane For Embedded Systems

Art Unit 2633

Examiner Sedighian Beza

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and appropriate non-small-entity fee are as follows (check time period desired):

- ☒ One month (37 CFR 1.17(a)(1)) \$ 110.00
- ☐ Two months (37 CFR 1.17(a)(2)) \$
- ☐ Three months (37 CFR 1.17(a)(3)) \$
- ☐ Four months (37 CFR 1.17(a)(4)) \$
- ☐ Five months (37 CFR 1.17(a)(5)) \$

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount shown above is reduced by one-half, and the resulting fee is: \$

☒ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to change fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number

I have enclosed a duplicate copy of this sheet.

I am the ☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

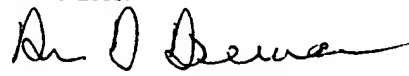
☒ attorney or agent of record. Registration Number 28,497

☐ attorney or agent under 37 CFR 1.34(a).

Registration number if acting under 37 CFR 1.34(a)

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Sep 20, 2004
Date


Signature

(949) 855-1246
Telephone Number

BRUCE B. BRUNDA
Typed or printed name

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Case No.: NORTH-390Q2
Patent Appln.: Unknown

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Shannon Mary Nelson

Serial No.: 09/544,762

Filed: 04/07/2000

For: RUGGED SHOCK RESISTANT)
BACKPLANE FOR EMBEDDED SYSTEMS)

)
) Group No.: 2633
)

) Examiner: Sedighian Beza
)
)

AMENDMENT

Box AF
ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON DC 20231

Dear Sir/Madam:

In response to the Office Action on May 19, 2004, please amend the application as follows:

In The Claims

1. (Currently Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a plurality of circuit cards, each of said circuit cards being mounted to one of said circuit card connectors, each of said circuit cards having a transmitter LED and a receiver photodiode formed thereon;

c) a plurality of optical pathways formed solely through air between said circuit cards, the optical pathways forming a plurality of independent optical connections between said transmitter LED on at least one of said circuit cards and said receiver ~~photodiodes~~ photodiode on any one of said circuit cards; and

d) wherein said circuit cards are maintained in fixed relationship to one another via said common backplane to maintain continuous optical intercard communications between each of said circuit cards such that the LED on each circuit card is operative to generate and transmit a signal, and the photodiode of one corresponding circuit card is operative to receive the signal through the corresponding optical pathway.

2. (Previously Amended) The system of Claim 1 wherein said signals generated by said transmitter LEDs and received by said photodiodes comprise optically transmitted infrared radiation.

3. (Previously Amended) The system of Claim 2 wherein said transmission and reception

of signals between said transmitter LEDs and said receiver photodiodes comprise a standardized infrared communications scheme protocol.

4. (Original) The system of Claim 3 wherein said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

5. (Previously Amended) The system of Claim 1 wherein said circuit cards are housed within an enclosure.

6. (Previously Amended) The system of Claim 1 wherein said circuit cards are operative to run an embedded application.

7. (Canceled).

8. (Currently Amended) A method for operatively interconnecting circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards ~~extending normal to the backplane~~ in a generally parallel upright relationship;

b) providing a plurality of circuit cards each having a transmitter LED diode and a receiver photodiode formed thereon;

c) mounting each of said circuit cards to ~~said~~ one corresponding circuit card connector ~~connectors~~ to establish a plurality of optical pathways between the LED diodes and the photodiodes of the corresponding circuit cards, such that a plurality of independent optical connections between the circuit cards are formed solely through air;

d) generating and transmitting a light from at least one of the LED diode, the light generated from the LED carrying data to be transmitted from the circuit card on which the at least

one LED diode is formed;

e) receiving the light by the photodiode formed on any of the circuit cards, so as to receive the data carried by the light.

9. (Previously Amended) The method of Claim 8 wherein in steps d) and e), said light generated by said LED and received by said photodiode comprise optically transmitted infrared radiation.

10. (Previously Amended) The method of Claim 8 wherein in the light transmitted from said LED to said photodiode comprise a standardized infrared communications scheme protocol.

11. (Previously Amended) The method of Claim 10 wherein said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. (Previously Amended) The method of Claim 10 wherein said circuit cards are operative to run an embedded application.

13. (Previously Amended) The method of Claim 8 wherein said circuit cards are operative to run an embedded application.

14. (Canceled).

15. (Previously Amended) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards extending normal to the backplane in a generally upright parallel relationship;

b) at least a first and a second circuit cards, a pair of first LED and photodiode and a pair

of second LED and photodiode formed thereon, respectively, the first and second LED's being operative to generate and transmit infrared signals which carry data to be transmitted from the first and second circuit cards, respectively, and the first and second photodiode being operative to receive the infrared signal generated by the second and the first LED's, respectively;

c) a first optical pathway formed between the first LED and the second photodiode, and a second optical pathway formed between the second LED and the first photodiode; and

d) wherein the first and second circuit cards are maintained in fixed relationship to one another, such that the first optical pathway is parallel to the second optical pathway, and the infrared signals are transmitted along the first and second optical pathways independently with each other.

16. (Previously Added) The system of Claim 15, wherein the computer system includes a digital camera or a hand-held data collection device.

REMARKS

The foregoing amendment and the following remarks are responsive to the First Office Action mailed May 19, 2004 for the request of continuing examination (RCE) of parent application 09/544,762 filed April 07, 2000. Final rejection has been made to Claims 1-16 in this First Office Action. The Applicant respectfully requests that the Examiner withdraw the final rejection. The Applicant has amended Claims 1 and 8 as above. Thus, entry of the amendment is respectfully requested, and it is respectfully submitted that, as amended, all the pending claims are allowable.

Request to Withdraw Final Rejection

On the Office Action Summary, the Examiner checked "2a) this action is FINAL". It is unclear whether this action was intended or inadvertent because the Examiner did not include the form paragraphs as required by the MPEP. When making a first action final rejection, MPEP 706.07(b) requires that the Examiner use Form Paragraphs 7.41 or 7.41.03. However, the Examiner did not include those form paragraphs. As such, Applicant is unsure of the Examiner's intent. In any case, Applicant respectfully requests Examiner to withdraw final rejection and allow the amendment.

Even assuming that the Examiner intended to make first action final rejection, Applicant submits that such action is not merited in the present case. According to MPEP 706.07(b), "*it would not be proper to make final a first Office Action in a continuing or substitute application where that application contains material which was presented in the earlier application after final rejection or closing of prosecution but was denied entry because (A) new issues were raised that required further consideration and/or search, or (B) the issue of new matter was raised.*" The current application is a request of continuation of examination (RCE). This RCE contains material

that was presented in the earlier application 09/544,762 after final rejection but was denied because new issues were raised that required further consideration and/or search. Thus, it would be improper to make a first action final rejection in the present application where the amendments should be considered. Therefore, the Applicant respectfully requests the final rejection to be withdrawn.

SUMMARY

Rejection Under 35 U.S.C. 112, first paragraph

Claims 1-6 were rejected under 35 U.S.C. 112, second paragraph based on lack of antecedent basis for the limitations “said receiver photodiodes” in line 13 and “said circuit” in line 17. The limitations “said receiver photodiodes” with “said receiver photodiode” in line 13 and “said circuits” in line 17 in Claim 1 have been amended as “said receiver photodiode” and “said circuit cards”, respectively. Therefore, the rejection over Claims 1-6 under 35 U.S.C. 112, second paragraph, is overcome.

Rejection Under 35 U.S.C. 103(a)

Claims 1-2, 6, 8-9, 13, and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (U.S. patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in further view of William (US patent No. 3,858,154).

Claim 1

As shown below, Applicant respectfully submits that Claim 1 should not be rejected under 35 U.S.C. 103(a). First, as understood by the Applicant, Ahmad et. al teaches only the use of chips (or integrated circuits), and does not appear to teach the use of circuit cards. Next, as understood

by the Applicant, Ahmad et al. does not appear to teach an upright relationship between chips or circuit cards. Additionally, as understood by the Applicant, Ahmad et al. appears to teaches away a plurality of circuit cards each being mounted to **one** of the circuit card connectors. As such, it appears that there is no suggestion or motivation for modifying “each chip being mounted to multiple connectors” disclosed in Ahmad et al. into “each circuit card being mounted to one connector” as claimed. Finally, as understood by the Applicant, it appears that neither Ahmad et. al, William, nor Davidson teach a shock-resistant system Therefore, Claim 1 is believed to be allowable.

Ahmad et. al Appears to Teach Only the Use of Chips (or Integrated Circuits)

As understood by the Applicant, it appears that all that Ahmad et al. teaches are chips (or integrated circuits) mounted on a substrate and interconnection between the chips. Ahmad et al. does not appear to disclose interconnection between interface cards. Further, Ahmad et al. does not appear to teach the use of circuit card connectors.

The disclosure of interconnection between integrated circuits or chips does not explicitly or implicitly teach the interconnection between the circuit cards. It is well known in the art that a chip is “[a] minute slice of a semiconducting material, such as silicon or germanium, doped and otherwise processed to have specified electrical characteristics, especially before it is developed into an electronic component or integrated circuit,” *see* www.Dictionary.com; an integrated circuit is “[a] complex set of electronic components and their interconnections that are etched or imprinted on a chip,” *see id.*; however, a circuit card is an electronic assembly of chips onto a single card, i.e., “a printed circuit that can be inserted into expansion slots in a computer to increase

the computer's capabilities," *see id.* Thus, although Ahmad et al. teaches interconnection between the integrated circuits, Ahmad et al. apparently fails to teach or suggest interconnection between circuit cards.

Ahmad et al. Does not Appear to Teach an Upright Relationship Between Circuit Cards

Claim 1 includes a plurality of **circuit cards connectors** for "supporting circuit cards in a generally **upright** parallel relationship." The Examiner stated that Ahmad et al. teaches "*a plurality of circuit card connectors (col. 3, lines 53-59 and 15, fig. 2) disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship (chips 14a-i are arranged in a parallel relationship with respect to each other)*". Ahmad et al. only appears to show the **parallel** relationship of the chips 14a-i with respect to each other, but apparently fails to teach the chips 14a-i being in **upright** relationship.

Ahmad et al. Appears to Teach Away a Plurality of Circuit Cards Each Being Mounted to **One** of the Circuit Card Connectors

As discussed above, the Examiner stated that Ahmad et al. teaches "*a plurality of circuit card connectors (col. 3, lines 53-59 and 15, fig. 2)*". In col. 3, lines 55-58, Ahmad et al. teaches:

Referring to FIGS. 1-3A, multi-chip module 10 comprises interconnection substrate 12 and an array of chips 14a-i arranged edge-to-edge. Chips 14a-i are connected to the substrate 12 through pins 15. Pins 15 may be formed with controlled-collapse chip-connections (also known in the art as C4, conductive adhesive bumps or other pinless connectors generally referred to as surface mount technology.

The teaching in col. 3, lines 55-58 cited by the Examiner does not show whether each circuit card is mounted to **one** of the connectors (pins 15) or not. However, in the only embodiment as shown in Fig. 2, Ahmad et al. appears to specifically show that each circuit card is mounted to

a **plurality** of connectors (pins 15). As understood by the Applicant, it is also well known in the art that a single pin can hardly achieve the connection between the chip and the substrate. *See e.g.* <http://www.computercraft.com/docs/chips.html> (explaining that a “caterpillar” contains a chip which is connected via many thin wires to the pins of the caterpillar). Therefore, Ahmad et al. appears to actually teach away “a plurality of circuit cards each being mounted to **one of the circuit card connectors**” as claimed in Claim 1.

Ahmad et. al Does Not Appear to Teach a Shock-Resistant System

Regarding Claim 1, the Examiner stated that “*Ahmad et al. discloses a shock-resistant system (10, fig. 1 and 32, fig 4) for interconnecting circuit cards (14g, 14h, fig. 1 and 34, fig. 4) to enable data to be transmitted and received therebetween (col. 3, lines 40-42, col. 5, lines 24-27)*”.

Ahmad et al. appears to teach a multi-chip module 10 (fig. 1) and a data processing system 32 (fig. 4). However, the Applicant could find no mention of or teaching or suggestion of a “shock-resistant” system in the disclosure of Ahmad et al.

Conclusion

It appears that neither Davidson nor William teach the above features that Ahmad et al. fails to teach. In addition, regardless what has been disclosed in Davidson and William, there is no apparent suggestion or motivation for modifying “each chip being mounted to multiple connectors” disclosed in Ahmad et al. into “each circuit card being mounted to one connector” as claimed. Therefore, because it appears that a *prima facie* case of obviousness cannot be proved, it is respectfully submitted that Claim 1 be allowed.

Claim 8

Similarly to Claim 1, it appears that a *prima facie* case of obviousness cannot be shown with respect to Claim 8. Regarding Claim 8, as Applicant understands, Ahmad et al. fails to teach many elements of Claim 8.

Ahmad et al. Appears to Fail to Teach the use of Circuit Cards

As discussed above, Ahmad et al. appears to only disclose the use of a plurality of chips (integrated circuits) formed on a substrate and interconnection between the chips. As discussed above, a chip (or an integrated circuit) and a circuit card are entirely distinct electronic equipment. Thus, although Ahmad et al. teaches interconnection between the integrated circuits, Ahmad et al. does not appear to expressly teach or suggest interconnection between circuit cards.

Ahmad et al. Appears to Fail to Teach a Plurality of Circuit Card Connectors

Ahmad et al. appears to teach a plurality of pins for connecting the chips to the substrate. However, the teaching of the pins does not explicitly or implicitly disclose the circuit card connectors.

Ahmad et al. Appears to Fail to Teach Upright Relation Between Circuit Cards

Ahmad et al. appears to disclose a plurality of chips extending parallel with the substrate. None of the chips 14a-i, 34a-d and 36 supported by the substrates 12 and 32 appear to be in upright relationship.

Ahmad et al. Appears to Fail to Teach Each of the Circuit Cards Mounted to **One** of the Circuit Card Connector

As discussed above, the Examiner stated that Ahmad et al. teaches “*a plurality of circuit*

card connectors (col. 3, lines 53-59 and 15, fig. 2)". Fig. 2 of Ahmad et al. appears to show that each chip 14a-i is mounted to a **plurality** of pins 15. The Examiner compared the plurality of pins 15 to circuit card connectors in Claim 8. Following this comparison, Ahmad et al. excludes the possibility of mounting a chip, or even more unlikely, mounting an entire circuit card with the use of only one connector. Therefore, Ahmad et al. appears to actually teach away "a plurality of circuit cards each being mounted to **one of the circuit card connectors**" as claimed in Claim 8.

Conclusion

It appears that neither Davidson nor William teach the above features that Ahmad et al. fails to teach. In addition, regardless what has been disclosed in Davidson and William, there is no apparent suggestion or motivation for modifying "each chip being mounted to multiple connectors" disclosed in Ahmad et al. into "each circuit card being mounted to one connector" as claimed. Therefore, because it appears that a *prima facie* case of obviousness cannot be proved, it is respectfully submitted that Claim 8 be allowed.

Claim 15

Finally, Applicant respectfully submits that Claim 15 does not appear to be *prima facie* obvious. It appears that Ahmad et al. fails to teach many key elements of Claim 15.

Ahmad et al. Appears to Fail to Teach A Plurality of Circuit Card Connectors for Supporting Circuit cards **Extending Normal** to the Backplane in a Generally **Upright** Parallel Relationship

In the Office Action, the Examiner is silent about the feature "for supporting circuit cards **extending normal to the backplane** in a generally **upright** parallel relationship" as claimed in Claim 15. Ahmad et al. appears to only teach a plurality of chips 14a-i, 34a-d and 36 extending

parallel to the substrates 12 and 32 (figs. 1, 2 and 4). Ahmad et. al appears not to make mention or suggestion of chips “extending normal to the backplane in a generally upright parallel relationship,” as taught by Claim 15.

Ahmad et al. Appears to Fail to Teach the use of Circuit Cards

As discussed above, Ahmad et al. appears to only disclose the use of a plurality of chips (integrated circuits) formed on a substrate and interconnection between the chips. A chip differs significantly from a circuit card. Thus, although Ahmad et al. teaches interconnection between the integrated circuits, Ahmad et al. apparently fails to teach or suggest interconnection between circuit cards.

Ahmad et al. Appears to Fail to Teach a Plurality of Circuit Card Connectors

Ahmad et al. teaches a plurality of pins for connecting the chips to the substrate. However, the teaching of the pins does not explicitly or implicitly disclose the circuit card connectors.

Ahmad et al. Appears to Fail to Teach a Shock-Resistant System

Regarding Claim 15, the Examiner contended that “*Ahmad et al. discloses a shock-resistant system (10, fig. 1 and 32, fig 4) for interconnecting circuit cards (14g, 14h, fig. 1 and 34, fig. 4) to enable data to be transmitted and received therebetween (col. 3, lines 40-42, col. 5, lines 24-27)*”.

Truly, Ahmad et al. teaches a multi-chip module 10 (fig. 1) and a data processing system 32 (fig. 4). However, it does not appear that Ahmad et al. discloses or teaches a “shock-resistant” system.

Conclusion

As to the Applicant's understanding, the features that Ahmad et al. fails to teach were not disclosed or suggested in either Davidson or William. More importantly, it appears that the feature of "circuit cards extending normally to the backplane" will change the principle of operation of the primary reference Ahmad et al. because C4 technology used in Ahmad et al. to mount the chips on the substrate does not apparently allow the chips to extend normal to the substrate. Therefore, because Applicant believes that Claim 15 is *prima facie* obvious, it is respectfully submitted that Claim 15 be allowed.

Claims 1-14

Primary Reference Ahmad et al. Appears to Teach Away "Each Circuit Card Mounted to **one** Connector" as Claimed in Claims 1-14

Claims 1-14 should be allowed because the primary reference Ahmad et al. appears to teach away the invention claimed in Claims 1-14. Ahmad et al. apparently teaches **chips or integrated circuits** (14a-i in fig. 1 and 34a-d and 36 in fig. 4) mounted on a substrate (10 and 32, respectively). Each of the chips or integrated circuits 14a-i, 34a-d and 36 appears to be connected to the substrate through a **plurality of connectors** (pins 15, fig. 2 and col. 3, lines 53-59). Ahmad et al. thus appears to teach away "each of said circuit cards being mounted to **one** of said circuit card connectors" as claimed in Claim 1 and "mounting each of said circuit cards to corresponding **one** of said circuit card connectors" as claimed in Claim 8. Further, as discussed above, it is well-known in the art that the connection between a chip and a substrate can hardly be achieved by a single pin (connector).

Additionally, regardless of what has been disclosed in the secondary references (Davidson and William), there appears to be no suggestion or motivation to one of ordinary skill in the art to modify Ahmad et al. into the invention as claimed in Claims 1 and 8. Therefore, Ahmad et al. appears to not only fail to teach every element as claimed in Claims 1 and 8 and Claims 2-7 and 9-14 depending thereupon, respectively, but also apparently fails to show any suggestion or motivation for modifying the Ahmad et al. into the claimed invention. Therefore, Claims 1-14 appear to be patentable over Ahmad et al., Davidson and William.

Claims 15-16

Primary Reference Ahmad et al. Teaches Away “Circuit Cards Extending Normal to the Common Backplane” in Claims 15-16


Ahmad et al. appears to teach a plurality of chips 14a-i, 34a-d and 36 arranged **edge-to-edge**. Further, as understood, the connectors (pins 15) are formed with controlled-collapse chip-connection (C4) that does not generally allow the chips to extend normal to the backplane (substrate) in a generally upright relationship. Therefore, Ahmad et al. appears to fail to teach every element as claimed in Claims 8-16. In addition, as understood, there is no suggestion or motivation to modify Ahmad et al. into the invention as claimed in Claims 15-16.

CONCLUSION

The rejections under 35 U.S.C. 103(a) are thus respectfully traversed and a Notice of Allowance is thus respectfully solicited. Should the Examiner have any suggestions for expediting allowance of the application, please contact applicant's representative at the telephone number listed below.

Respectfully submitted,

Date: Sep 20, 2004

By: 

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Registration No. 28,947
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- Papers transmitted herewith:
1. Amendment (of 15 pages);
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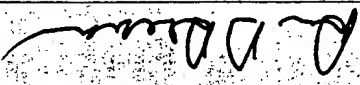
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FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

Complete if Known

Application Number	09/544,762
Filing Date	April 7, 2000
First Named Inventor	Shannon Mary Nelson
Examiner Name	Reza Sedighian
Art Unit	2633
Attorney Docket No.	NORTE-390Q2

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 340.00

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 790	2001 395	Utility filing fee	
1002 350	2002 175	Design filing fee	
1003 550	2003 275	Plant filing fee	
1004 790	2004 395	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1) (\$)			0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 88	2201 44	Independent claims in excess of 3
1203 300	2203 150	Multiple dependent claim, if not paid
1204 88	2204 44	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

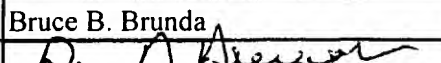
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FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 430	2252 215	Extension for reply within second month	
1253 980	2253 490	Extension for reply within third month	
1254 1,530	2254 7650	Extension for reply within fourth month	
1255 2,080	2255 1,040	Extension for reply within fifth month	
1401 340	2401 170	Notice of Appeal	340.00
1402 340	2402 170	Filing a brief in support of an appeal	
1403 300	2403 150	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,370	2453 685	Petition to revive - unintentional	
1501 1,370	2501 685	Utility issue fee (or reissue)	
1502 490	2502 245	Design issue fee	
1503 660	2503 330	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 790	2809 395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 790	2810 395	For each additional invention to be examined (37 CFR 1.129(b))	
1801 790	2801 395	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	
Other fee (specify)			
*Reduced by Basic Filing Fee Paid			
SUBTOTAL (3) (\$)			340.00

SUBMITTED BY

Name (Print/Type)	Bruce B. Brunda	Registration No. (Attorney/Agent)	28,497	Telephone	(949) 855-1246
Signature		Date	November 19, 2004		

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	Filing Date	April 7, 2000
	First Named Inventor	Shannon Mary Nelson
	Art Unit	2633
	Examiner Name	Sedighian Beza
Total Number of Pages in This Submission	Attorney Docket Number	NORTE-390Q2

ENCLOSURES (Check all that apply)		
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

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Docket Number (Optional)

NORTE-390Q2

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Typed or printed name

Dawn A. Privett

In re Application of

Shannon Mary Nelson

Application Number

10/544,762

Filed

April 7, 2000

For Rugged Shock Resistant Backplane ...

Art Unit

2366

Examiner

Reza Sedighian

Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 1.17(b))


\$ 340.00

- ☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: \$ _____
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I am the

- ☐ applicant/inventor.
- ☐ assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)
- ☒ attorney or agent of record.
Registration number 28,497
- ☐ attorney or agent acting under 37 CFR 1.34(a).
Registration number if acting under 37 CFR 1.34(a) _____


Signature

Bruce B. Brunda

Typed or printed name

(949)855-1246

Telephone number

Nov 19, 2004

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.191. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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CHANGE OF CORRESPONDENCE ADDRESS *Application*

Address to:
Assistant Commissioner for Patents
Washington, D.C. 20231

Application Number	09/544,762
Filing Date	April 7, 2000
First Named Inventor	Shannon Mary Nelson
Art Unit	2633
Examiner Name	Reza Sedighian
Attorney Docket Number	NORTE-390Q2

Please change the Correspondence Address for the above-identified application to:



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007663

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Assignee of record of the entire interest.

Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).



Attorney or Agent of record.



Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number _____

Typed or Printed
Name

Bruce B. Brunda

Signature

Bruce B. Brunda

Date

November 19, 2004

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.



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FROM:

LAW OFFICES

Steina Brunda Garred & Brucker

PATENT, TRADEMARK, AND COPYRIGHT CAUSES

75 ENTERPRISE, SUITE 250

ALISO VIEJO, CALIFORNIA 92656

TO:

Commissioner for Patents

NOTICE OF APPEAL

P.O. Box 1450

Alexandria, VA 22313-1450

FIRST CLASS MAIL

Dear Sir:

(BBB/dp)

Please date stamp and return this card, adding the serial number assigned where applicable.

Date Mailed: November 19, 2004

Docket Number: NORTE-390Q2

Serial No.: 09/544,762

Filing Date: April 7, 2000

Title: RUGGED SHOCK RESISTANT
BACKPLANE FOR EMBEDDED SYSTEM

Papers transmitted herewith:

Notice of Appeal; Fee Transmittal (in duplicate); Check for \$340.00; Change of Correspondence Address; Transmittal Form; Certificate of Mailing; and Return Postcard.

0053245

Nov 19, 2004

COMMISSIONER OF PATENTS

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Notice of Appeal NORTE390Q2

"053245" 1220033961 3030015731"



UNITED STATES PATENT AND TRADEMARK OFFICE

A-2241

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/544,762

04/07/2000

Shannon Mary Nelson

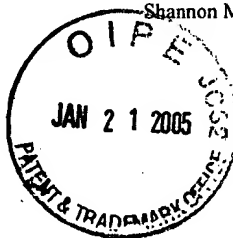
NORTH-390A/A-2241

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12/17/2004

Terry J Anderson Esq
Northrop Grumman Corporation
1840 Century Park East
Los Angeles, CA 92677-2199



EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 12/17/2004

Final
RESPONSE DUE: 3-17-05

RESPONSE DEADLINE: 6-17-05

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/544,762

Applicant(s)

NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-13,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-13,15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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1. This communication is responsive to applicant's 9/23/2004 amendments in the application of Shannon Mary Nelson et al. for "Rugged shock resistant backplane for embedded systems" filed 4/7/2000. The amendments have been entered. Claims 1-6, 8-13, and 15-16 are now pending.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 6, 8-9, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in further view of William (US patent No: 3,858,154).

Regarding claims 1, 8, and 15, Ahmad discloses a shock-resistant system (10, fig. 1 and 32, fig. 4) for interconnecting circuit cards (14g, 14h, fig. 1 and 34, fig. 4) to enable data to be transmitted and received therebetween (col. 3, lines 40-42, col. 5, lines 24-27), comprising: a common backplane (12, fig. 1 and 38, fig. 4) having a plurality of circuit card connectors (col. 3, lines 53-59 and 15, fig. 2) disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship (chips 14a-i are arranged in a parallel relationship with respect to each other); a plurality of circuit cards (14g, 14h, fig. 1 and 34, 36, fig. 4) each being mounted to one of the circuit card connectors (col. 3, lines 55-58) and having a transmitter LED (20a, fig. 3A) and a receiver photodiode formed thereon (22b, fig. 3A); a plurality of optical pathways (25, fig. 2 and 24, fig. 3A) formed solely through air between the circuit cards (col. 4,

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lines 10-15), the optical pathways forming a plurality of independent optical connections (note that there are a plurality of optical path ways 24 between transmitters 20a, 20c, 20e of circuit card 14g and the optical receivers 22a, 22c, 22e of the circuit card 14h) between the transmitter LED (20a, fig. 3A) on at least one of the circuit cards (14g, fig. 3A) and the receiver photodiode (22a, fig. 4) on the other circuit cards (14h, fig. 3A and col. 4, lines 15-20); and wherein the circuit cards (14g, 14h, fig. 3A) are maintained in fixed relationship to one another via the common backplane (12, fig. 3A) to maintain continuous optical intercard communications between each of the circuit cards such that the LED on each circuit card is operative to generate and transmit a signal and the photodiode of one corresponding circuit card is operative to receive the signal through the corresponding optical pathway (col. 4, lines 15-21). Ahmad differs from the claimed invention in that Ahmad does not specifically disclose the interconnected circuit cards are within a computer system. Davidson teaches the interconnection of optical circuit cards (100, 104, fig. 8) within a computer system (col. 12, lines 14-28). One of the ordinary skill in the art would have been motivated to incorporate a plurality of interconnected optical circuit cards within a computer system to provide a high speed data communication between the elements of the computer system. As it is taught by Davidson, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the ones of Ahmad within a computer system to provide a high speed optical data communication between the sub-system elements within a computer to increase the bandwidth. The modified optical data transmission system of Ahmad and Davidson differs from the claimed invention in that Ahmad and Davidson do not specifically disclose circuit cards are extended normal to a back plane. William teaches a common backplane having a plurality of circuit cards

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connectors disposed in spaced apart relationship for supporting circuit cards extending normal to the backplane (col. 1, lines 21-31 and figs. 1, 6). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to provide a supporting structure, wherein circuit cards are extended normal to a backplane, as it is taught by William, for the circuit cards and the backplane, in the modified optical data transmission system of Ahmad and Davidson in order to transmit the optical signals at a plurality of different paths and different directions. As to claims 8 and 15, Ahmad further teaches generating and transmitting a light from at least one of the LED diode (for example, transmitter 20a in fig. 3A) and receiving the light by the photodiode formed on any of the circuit cards (for example, by receiver 22a that can be considered as a photodiode that is formed on any one of the circuit cards such as circuit card 14h) to receive the data carried by the light (col. 4, lines 4-17).

Regarding claims 2 and 9, Ahmad discloses optically transmitted infrared radiation (col. 3, line 25-27).

Regarding claims 6 and 13, Ahmad discloses the first and second circuit cards are operative to run an embedded application (col. 5, lines 30-33).

4. Claims 3-4 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and in view of William (US patent No: 3,858,154) and in further view of Croft et al. (US Patent No: 5,864,708).

Regarding claims 3-4 and 10-11, the combination of Ahmad, Davidson, and William differs from the claimed invention in that Ahmad, Davidson, and William do not specifically

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disclose the transmission and reception signals comprise a standardized infrared communication scheme protocol that is developed by the infrared data association. Croft discloses wireless transceivers (63, 64, fig. 1) that communicate with each other by using Infrared Data Association standards (col. 3, lines 5-14). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Infrared Data Association standards or protocols such as the one discussed by Croft for the optical data transmission and reception in the modified optical communication systems of Ahmad, Davidson, and William in order to provide a reliable method of data transmission by implementing a standard Infrared protocol to detect transmission errors and to avoid collisions.

5. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and William (US patent No: 3,858,154) and in further view of Barina (US Patent No: 4,829,596).

Regarding claims 5 and 12, the combination of Ahmad, Davidson, and William differs from the claimed invention in that Ahmad, Davidson, and William do not disclose the first and second circuit cards are housed within an enclosure. Barina discloses a housing (12, fig. 1) which includes a series of slots that receive a plurality of circuit boards (16-18, fig. 1) that are connected to a mother board which extends along the back surface of the housing to a backplane (col. 2, lines 55-61 and 11, fig. 1). It is inherent that electrical or optical components are housed within a housing for the reason of safety and protection, and it would have been obvious to provide an enclosure such as the one Barina for the optical circuit cards in the modified optical

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communication system of Ahmad, Davidson, and William in order to protect it's components and to provide safety for the users.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US patent No: 5,818,984) in view of Davidson (US patent No: 6,160,653) and William (US patent No: 3,858,154) and in further view of Cargin, Jr. et al. (US Patent No: 6,023,147).

Regarding claim 16, the combination of Ahmad, Davidson, and William differs from the claimed invention in that Ahmad, Davidson, and William do not disclose the computer system includes a hand-held data collection device. Cargin discloses a hand-held data collection device (col. 3, lines 55-60 and 10, fig. 1) that includes a plurality of circuit cards (col. 10, lines 22-29). Therefore, it would have been obvious to an artisan at the time of invention to incorporate a plurality of interconnected optical circuit cards such as the ones of Ahmad within a computer system such as of Davidson, or within a data collection device such as of Cargin to provide a high speed optical data transmission between sub-system elements of the computer system to increase the bandwidth.

7. Applicant's arguments filed 9/23/2004 have been fully considered but they are not persuasive.

Remark states Ahmad teaches only the use of chips, or integrated circuits, and does not appear to teach the use of circuit cards. However, a chip, or an integrated circuit can be considered as a circuit card, or it can be imposed on a circuit card, as such concept is taught by references of Estrada et al. (US Patent No: 5,611,022, see col. 4, lines 32-35) and Reichardt et al.

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(US Patent No: 5,269,707, see col. 1, lines 19-20). Remark further states Ahmad does not teach an upright relationship between chips, or circuit cards. Ahmad in figs. 2 and 3A teaches two chip 14g and 14h that are positioned on a substrate 12, and it appears the two chip are positioned in an upright relationship to each other to transmit and receive optical signals 24 through free space 25. Furthermore, positioning the chips 14, or circuit cards 14, in an upright position is merely a matter of design choice, and it would have been obvious to a person of ordinary skill in the art that such chips can be positioned in an upright relationship to each other in order to provide a specific bi-directional transmission. Remark further states Ahmad teaches away that a plurality of circuit cards each being mounted to one of circuit card connectors. Ahmad teaches the chips are connected to substrate 12 through pins 15, and pins 15 maybe formed with controlled collapse chip connections, conductive adhesive bumps, or other pinless connectors (col. 3, lines 55-59). The collection of pins 15 that are used to connect a chip 14 to substrate 12 can be considered as the circuit card connector. Accordingly, for each chip 14 there is a collection of pins 15 that can make the circuit card connector for that chip to be connected to substrate 12. Therefore, it would have been obvious that chips 14a-i, each can be mounted to respective circuit card connectors such that the connection to substrate 12 can be made possible. Remark further states Ahmad, William, and Davidson fail to disclose a shock-resistant system. However, it is obvious and it is well known that electrical or optical components can be housed within a shock-resistant housing for reasons of safety and protection, as such enclosures are well known, and as it is taught by Barina. Applicant's attention is directed that during the prosecution of a pending patent application the terms found in the claims should be given the broadest reasonable interpretation, *See in re Pearson*, 181 USPQ 641 (CCPA 1974).

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should be given the broadest reasonable interpretation, *See in re Pearson*, 181 USPQ 641 (CCPA 1974).

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (571) 272-3034. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


M. R. SEDIGHIAN
PRIMARY EXAMINER

Notice of References Cited

Application/Control No.

09/544,762

Applicant(s)/Patent Under
Reexamination
NELSON ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-5,611,022	03-1997	Estrada et al.	358/1.9
	B	US-5,269,707	12-1993	Reichardt et al.	439/630
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	Q					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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